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**JOURNAL**

OF

*Aug 18 1836*

**The Philadelphia College of Pharmacy.**

EDITED BY

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*Professor of Materia Medica and Pharmacy in the College, &c.*

ASSISTED BY

**A Publishing Committee**

CONSISTING OF

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*Professor of Chemistry in the College, &c.*

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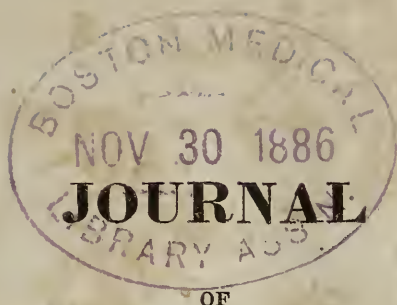
## PREFACE.

In presenting to the public the fourth and last number of the first volume of our Journal, we cannot omit the opportunity it furnishes for expressing our gratification for the encouragement afforded us. The work was commenced under discouraging circumstances :— a previous attempt had been made to publish a journal under the auspices of the college, devoted to pharmaceutical subjects, which failed from a defect in its plan. We were therefore far from being sanguine of success ; but the assistance derived from various sources, and the zeal, interest and liberality displayed by the members of the college, have combined to sustain in its infancy the only Journal of Pharmacy in the United States. Our members are beginning to feel and appreciate the influence which such a work may exercise on the reputation of their college, and the general prosperity of their profession. And we only ask a continuance of the same generosity and hearty support to enable us to redeem our pledge to them and the public. We would invite every member to feel himself personally interested in the success of this enterprise, and whenever his business may call him abroad, to remember that he has it in his power to advance the prospects of the Journal, and promote the objects for which the college was instituted, by calling the attention and obtaining the pecuniary support of every druggist with whom he may have business. To our distant subscribers we would observe that promptness in their remittances is absolutely essential to enable us to comply with our engagements. The difficulty of remitting two dollars and fifty cents by mail may be obviated, in many instances, by two subscribers residing in one place

### *Preface.*

inclosing their joint subscription in the same letter. And where there is but one subscriber in a village or district of country, we would solicit him, if he feels interested for the continuance of the Journal, to invite his neighbour to subscribe, and thus overcome the difficulty of making a remittance for one year.





OF

# **The Philadelphia College of Pharmacy.**

*NEW SERIES.*

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VOL. I.—APRIL 1829.—NO. I.

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## **PROSPECTUS.**

The Philadelphia College of Pharmacy having determined, as soon after its organization as was practicable, to commence the publication of a Journal devoted to Pharmaceutical research, the undertaking was entrusted to a Publication Committee, with instructions to publish a number as often as a sufficient quantity of original matter should accumulate in its hands.

Four numbers were printed at long and irregular intervals under this arrangement, which was at length suspended from circumstances inseparable from the plan adopted of depending principally upon original essays and researches.

Notwithstanding this temporary abandonment of the undertaking, it was at the time believed, that by a regular periodical appearance of the Journal, and by making it to consist chiefly of extracts from foreign scientific works, the design of the College in authorising the publication would be fully attained.

The wants of society and the profession demand some medium by means of which knowledge, so valuable and in-

VOL. I.—A



teresting, may be more widely and speedily circulated, and made more generally accessible.

The College of Pharmacy, therefore, in accordance with these views, purposes to publish a Quarterly Journal, which shall embrace, at once, as much original matter as can be procured in the several branches of science connected with Pharmacy, and the most important discoveries and improvements made in the art by Europeans.

Considering the obvious utility of such a work, the College relies, with entire confidence, upon the friendly and liberal support of those who, from education and necessity, are interested in the prosperity of Pharmacy. And from the zeal displayed, and talent enlisted in the cultivation and improvement of every department of medicine, the College is persuaded that the members of the medical profession will not regard with indifference an undertaking calculated to give certainty and efficiency to one of the most important branches of their science.

The subjects to be embraced in this journal will be those strictly connected with Pharmacy. Chemistry (General and Pharmaceutic), Materia Medica, Zoology, Botany, and Mineralogy, are the legitimate objects of the Pharmaceutist, and form the elements of his art.

Original essays upon any of these subjects will always be gladly received; and copious extracts and translations will be made from the journals published at home and abroad.

The Journal will be published quarterly, in an octavo form; each number to consist of 80 pages. The paper will be of good quality, the type large and clear, and attention paid to neatness in the general execution. Price \$2 50 per annum.

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|---|--------------------------------|
| DANIEL B. SMITH,<br>BENJAMIN ELLIS, M.D.<br>CHARLES ELLIS,<br>SAMUEL P. GRIFFITS, JR, | } Committee of<br>Publication. |
|---|--------------------------------|

## Original Communications.

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*On Copaiba. By Elias Durand.—Read December 30, 1828.*

This oleo-resin, improperly called balsam, is procured by incision, made during the warm season, in the bark of the trunk of the *copaifera officinalis*, L. a tree belonging to the natural order *leguminosæ*, and the tenth class, first order, of the sexual system of Linnæus. This tree grows in South America, and in some of the West India islands, where it has been, probably, naturalized.

The best copaiba comes from Brazil, and is furnished by the oldest trees. It has an oily consistence, more or less thick, according to its age and that of the trees from which it may have been extracted. It is transparent, of a yellowish colour, and has an aromatic, but rather an unpleasant smell; its taste is bitter and acrid, leaving an impression on the palate of a warm and most revolting nature. Its specific gravity has been fixed at 0.950, but it differs in this respect according as it is more or less fluid. That which I tried possessed all the characters of genuine copaiba, and I found it to be very nearly of the same density as distilled water. Immersed in this liquid, it sunk in globules, and at times formed a column from the bottom to the surface; but when slightly warmed, the copaiba invariably rose to the top, to sink again on cooling.

It requires twenty-five times its weight of alcohol of 35° of Baumé's areometer, to effect a perfectly transparent solution, leaving behind an insoluble fatty matter, which precipitates in the form of semifluid, transparent, and yellowish

globules, not soluble in any additional quantity of the same menstruum; but the whole of the copaiba dissolves in ether, absolute alcohol, and essential oils. On mixing a watery solution of litmus with cold copaiba, no change is observable in this solution. By warming the mixture, a slight reddish hue appears, and the addition of alcohol developes instantly a lively red colour. If, instead of a watery, an alcoholic solution of litmus is used, the red colour is immediately produced, and a few drops of ammonia, mixed with this oleo-resin, soon loses its pungent smell, and seems to have entered into a combination.

“When mixed with one-seventeenth of pure magnesia, it acquires a degree of solidity sufficient to allow it to be formed into pills.”—*Revue Medicale*. This mixture requires six or eight hours to thicken, and in time becomes still more solid. Its specific gravity is raised to 1059. Magnesia seems to act especially upon the resin, and to this may be mainly attributed the solidification. When the oil is distilled off from the solidified copaiba, it rises in a dense cloud, filling the body and a part of the neck of the retort, and the resin becomes almost solidified, while still warm. By stopping the process at this stage, a portion of the oil may be removed in a fluid state, by pouring from the retort while the resin remains in a condition approaching solidity. The resin thus produced cracks as it cools, and becomes of a flinty hardness when cold. No other article, except *perfectly pure magnesia*, accomplishes this solidification. Potassa, soda, lime, ammonia, their carbonates, and that of magnesia, do not; but they generally form saponaceous compounds, capable of being suspended in water, and resembling a mucilage of gum arabic.

This mucilaginous appearance of copaiba, when treated with alkalies, was proposed to the School of Pharmacy of Paris, as a criterion for discovering the sophistication of the article. I have made a number of experiments in relation to this particular point, on mixtures of copaiba with the principal substances with which the article is likely to be



adulterated, and I have found that the solidification by pure magnesia was an excellent test for ascertaining the presence of a fixed or essential oil. There is, then, no complete solidification, but only a production of a thick consistence, resembling that of a viscid mucilage. Lime water, by a long contact with this oleo-resin, converts it into a substance similar to soft white wax.

Bergius says that "two pounds of copaiba gave twenty ounces of essential oil, and twelve of dry resin." These proportions must undoubtedly vary, according to the quality of that substance. I scarcely obtained eight ounces to the pound from the sample I subjected to experiment, and in this respect I am in accordance with several writers on the same subject. It is mentioned in Neuman's Chemistry, page 285, that "it is observable that, on mixing the copaiba with the watery spirit of sal ammoniac made by quick lime, a frothing or effervescence ensues, stronger, and of a longer continuance, than that produced by the same spirit with any other natural balsam, and that by this mark we may distinguish the genuine drug from the resin of turpentine of the fir tree, which is frequently mixed with or vended for it." I have not found this to be the case with the aqua ammoniæ, which I think must be the spirit alluded to, on account of the expression "*made with quicklime*;" but I obtained a very evident effervescence by mixing the liquor sub-carbonatis ammoniæ, formerly called spirit of sal ammoniac, with a solution of copaiba in ether. The turpentine, &c. may always be easily detected by their smell by experienced pharmaciens.

Copaiba seems to be composed of an *essential oil* forming about one-half of its weight, a *resin*, a small quantity of *acid* possessing the characters of *acetic acid*, a *fatty matter*, traces of *muriate of lime* and of a *sweet substance*.

The essential oil is obtained by distillation, and passes over at a temperature of 228° Fahr. It is limpid and colourless, marks 25° on Baumé's areometer. Its specific gravity is 0.880. It is volatile and inflammable, possessing a pecu-

liar taste and smell, and is far less bitter and acrid than that of the essential oil of turpentine. Cold alcohol dissolves one twenty-fifth of its weight; but when boiling, more than double this quantity, part of which precipitates on cooling. Sulphuric ether takes up about its own volume, and strong nitrous ether one-sixteenth of its weight. It mixes with alkalies, and does not redden the tincture of litmus.

It is an *excellent solvent of caoutchouc*. *Potassium is not affected by it*. Indeed this oil, well rectified, is far preferable to any purified naphtha I have been able to procure, as a means of preserving potassium\*. We may infer from this circumstance, that the essential oil of copaiba does not contain oxygen, and that it is composed exclusively of hydrogen and carbon, with perhaps a trace of nitrogen. It seems to contain carbon in a greater proportion than the oil of turpentine.

In the Edinburgh Encyclopedia, article Copaiba, it is stated, that "the experiments of Shenberg have rendered it probable that this substance is decomposed when distilled along with water, and that both the oil and resin are mere products." I am not informed as to the nature of Shenberg's experiments, but I have no doubt that he is mistaken on this point. Copaiba distilled either with water, alcohol, or per se, gives invariably the same products.

It is difficult to distil it with water, on account of the difference in the densities of the two liquids when heated, and in the degree of heat at which they assume the state of vapours. As the water boils at a temperature much below that requisite to vapourize the oil, it has to force its way through the viscous mass of copaiba, producing flaws and detonations, and throwing at times both copaiba and water into the receiver. In the distillation with alcohol, about one-half of the spirit passes first, almost in a state of purity, then the remainder, together with some essential oil in solu-

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\* The surface of potassium is commonly altered in the naphtha, and converted into a black crust; but in oil of copaiba, it retains all its metallic lustre.



tion, and lastly the oil alone, which sinks. The distillation per se is preferable, and more expeditious, but the oil requires to be redistilled when the operation has been carried too far; for I have observed in this latter process, that the oil becomes coloured towards the end, as is mentioned in a note to Neuman's Chemistry, page 285, where it is said that "it is observable that the copaiba, being distilled in a retort, gives over, towards the end of the operation, an oil of a fine blue colour, preceded by a limpid and yellowish or brownish one." I have not found this to be exactly the case, but the slight difference may have proceeded from the degree of heat applied. I employed a glass alembic, in a sand bath, at a temperature between 230° and 250° Fahr. The operation was slow, and the first product quite colourless, but the oil gradually acquired a greener appearance. I received separately the last product, which was of a lively greenish blue colour, possessing a stronger taste and smell of the copaiba than the colourless oil. By a redistillation of the whole, a pure oil, without colour, may be obtained, leaving in the retort a residue, of a brown resinous appearance. The blue oil acted slowly on the potassium, which was at last completely dissolved, and had then acquired a deep brown hue.

The resin, when reduced to dryness, is tasteless and inodorous; it dissolves in alcohol, and leaves behind a fatty matter. By adding to it the exact proportion of essential oil which had been withdrawn by distillation, it forms a new compound, more highly coloured than the copaiba, but possessing a still greater fluidity and lightness, and very near the same smell and taste, with the property of solidifying with pure magnesia. The resin retains a great proportion of the acid, as I have ascertained by the strong effervescence produced when its alcoholic solution is mixed with carbonates, and its powerful action on litmus. Its medicinal properties are more than doubtful.

The Edinburgh Encyclopedia mentions, that the resinous matter, when distilled, yields a yellowish thick oil; some

acidulous water; a gas, one sixth of which is carbonic acid gas, and the remainder an olefiant gas.

The existence of an acid in copaiba seems to be satisfactorily demonstrated by several of the above results. If it does not exist in combination with the resin, it is at least so intimately associated with it, that its character is marked. Dr Staples was good enough to perform for me the following experiments, and to this gentleman I am indebted for several others mentioned in this paper.

*Experiment 1.* He boiled a small proportion of the copaiba, for a few minutes, with eight or ten times its bulk of alcohol; upon cooling the alcohol became gradually clear, and a few globules of the copaiba subsided. A portion of the alcohol having been poured into six or eight times its weight of water; the whole became milky, which appearance it retained with pertinacity. Part of the milky fluid was passed through a double filter, but it still retained its opacity to a considerable degree. Upon trial of this filtered liquor with a solution of litmus, it changed to a cloudy red.

*Experiment 2.* To about four ounces of boiling alcohol of 35° Baumé's areometer, copaiba was added to saturation; while still hot, protoxide of lead was added in small quantity, and the alcohol was then removed by distillation. A small portion of water introduced towards the close of the operation was separated when cold by the filter, and upon examination was found to contain acetate of lead in solution.

*Experiment 3.* Having removed from copaiba by distillation about one third of its bulk of oil, and a small portion of acid, the resinous substance remaining in the retort was acted upon by boiling alcohol of 35° until nearly the whole was dissolved. The alcohol was then separated; and when still hot protoxide of lead was added. Upon removing the alcohol by evaporation and adding towards the close a small portion of pure water, this menstruum, when cold and sepa-

rated from the copaiba by a filter, contained acetate of lead.

No account that I have read or heard of gives to the acid its true character\*. Indeed those who speak of the products of copaiba by distillation seem to leave us to infer, that the acid is not suspected to exist in this substance; a few merely observing that acidulous water is found in the retort.

This acid passes in the distillation at a temperature below  $212^{\circ}$ , and continues to pass together with the oil, from which it separates and sinks. It exists in a very small proportion, and is certainly not a product of distillation, as a comparatively large quantity remains in the resin with which it is intimately blended. If otherwise it would be removed at the earlier stage of the distillation, even before the heat rises sufficiently high to boil the copaiba. How is it that alcohol liberates the acid from the copaiba, if it is not by separating the particles of that substance, so as to enable the acid to act on the bodies with which it is in contact? The acid obtained by distillation has the taste and smell of the acetic acid; it unites with the protoxide of lead and forms a soluble salt having all the characters of sugar of lead.

The fatty substance is soluble in ether, absolute alcohol and essential oils, but not in water or any quantity of alcohol of  $35^{\circ}$ . It is greasy to the touch, of a light yellow colour, possesses a strong taste of copaiba, and leaves a very irritating and lasting impression on the palate. It is sepa-

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\* Since the reading of this paper before the College of Pharmacy, I have found that, "from the experiments made upon the natural resins by M. Bonastre, one of the most eminent apothecaries of Paris, these substances were composed of the following principles: 1, a volatile oil; 2, an acid (the acetic and frequently succinic in the products of coniferous trees); 3, a resin soluble in cold alcohol; 4, a sub-resin opaque, most always insoluble in boiling alcohol and ether; 5, and lastly, a bitter extractive containing several salts." The coincidence of these results with those I have obtained in the present analysis, corroborates the accuracy of my experiments upon copaiba, which is nothing else but a natural resin.



rated from copaiba by dissolving the latter in alcohol, and from the dry resin by the same means; but when obtained from the latter it has a more intense colour. By drying it becomes more consistent and adhesive.

The decoction of copaiba in distilled water has an aromatic smell and a pure bitter taste. It gives no indication of acidity when filtered and evaporated, but is found to contain a small portion of balsam, a sweetish substance in small quantity, without any gum. When treated with a little distilled water to test the presence of any saline substance, muriate of lime appeared to be dissolved; for upon trying the solution with oxalate of ammonia and nitrate of silver, a precipitate was immediately formed. This solution was not affected by muriate of baryta.

The disgusting taste of this valuable medicine which is as yet considered the best of the remedial substances exhibited in chronic blennorrhœa and other mucous discharges from the urethra, has been a source of great annoyance to patients as well as practitioners. It has been associated with different substances, with a view to cover its revolting smell and savour, and correct its irritating action, without much success. Indeed no medicine has, on these accounts, more completely tried the patience and baffled the ingenuity of physicians and pharmacutists.

The resin, under the name of extract of copaiba, has been administered in pills. I prepared some two years ago, at the request of several physicians, and although it was not deprived entirely of its oil, it was soon ascertained that the properties of the drug had been considerably impaired by the operation to which it had been subjected. I know of but one instance in the medical practice of this city, of the employment of the essential oil. It was prepared by the physician himself for his own patients, to whom, as he has assured me, it proved in every instance beneficial.

It was introduced last year to the French practice by M. Dublanc, Jun.; and the *Revue Medicale* mentions the happy

results of its use. Drs Bard and Cuellerier witnessed its effects in thirty patients, who were cured in five or six days. Like copaiba itself the essential oil often produces alvine evacuations, which counteract its remedial effect. M. Dublanc thinks he has succeeded in preventing this action, which seems to be unfavourable to the cure, by the employment of the following mixture :

R.—Syrupi tolutani, ℥ij.  
 Aquæ menthæ piperitæ,  
 Spiritus olei essential. copaibæ, āā ℥iij.  
 Extracti opii, gr. j.

Fiat mistura. Signa—from three to six table spoonsful a day.

M. Dublanc says that he forms his spirit of essential oil of copaiba, by distilling one part of the oil with two of alcohol, without mentioning whether the whole formed an homogeneous preparation. I have repeated his process with alcohol of 35°; but I found that excepting one twenty-fifth which remained in solution in the alcohol, the oil separated in the receiver, as I had previously ascertained by the direct mixture of both these substances.

This solution is not unpleasant, and may be administered alone, or in conjunction with the tincture of cubebs or with syrup. The formula of M. Dublanc affords a palatable mixture. An emulsion may also be formed in the following manner :

R.—Olei essential. copaibæ, ℥ij.  
 Pulveris gummi acaciæ, ℥ss.  
 Aquæ cinnamomi, ℥ij.  
 Syrupi simplicis, ℥iss.  
 Tincturæ opii, ℥ss.

Misce. Signa—dose a table spoonful.

These preparations of the essential oil are by no means so unpleasant as those of the copaiba, and deserve to be fairly tried by our medical men. The copaiba, solidified by its union with magnesia, has the great advantage of being prepared without much trouble or expense, and of offering



a pilular consistence, free from the disgusting and sickening taste of the copaiba. Its medicinal properties are not in the least impaired by the small proportion of one seventeenth of pure magnesia, and it presents many advantages, together with the oil or the spirit, to medical practitioners. They have of late been prescribed, and several physicians have reported favourably as to their efficacy.

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*Observations on Opium, and some of its Constituents. By Edward Staples, M.D.—Read February 23, 1829.*

The researches of MM. Derosne, Sertuerner, Robiquet, and other chemists, have shown that there exist in that highly complex drug opium, intimately connected with a variety of other substances, two of the highest importance to chemists and physicians : besides which others of minor importance are recognized, viz. resin, fixed oil, a substance resembling caoutchouc, a vegeto-animal substance, mucilage, fecula, vegetable fibre, meconic acid, extractive, and, according to researches not fully disclosed, made by M. Robinet\*, codeic acid, meconate of soda, and even cyanogen†.

It is intended, on the present occasion, only to notice directly, the two most important substances found in opium, viz. morphia and narcotine, incidentally referring to others of minor importance ; as the chief object in view is to draw some practical deductions from experiment and observation, applicable to the preparation of these important proximate principles.

Before entering upon the consideration of the immediate objects in view, it is not improper to make a few remarks

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\* Formulaire, par F. Magendie, cinquième édition.

† Probably an erroneous conclusion.

relating to extractive. This substance, now distinguished from vegetable extracts by the term extractive principle, of the existence of which, as a peculiar vegetable substance\*, eminent chemists have expressed their doubts, and which M. Magendie has discarded from the substances enumerated as constituents of opium in his formulary, was, by M. Sertuerner, who first pointed out the alkaloid character of morphia, estimated, in consequence of its peculiar association with other substances in opium, as one of considerable importance: his researches were the result of elaborate experiments, and his opinion is certainly entitled to much respect. It is certain that morphia, in the state in which it exists in opium, carries into all its solutions a substance answering to the usual indications of extractive. If the tincture, or aqueous solution of opium be treated with a solution of acetate of lead as long as any precipitate is produced, and the precipitate separated by filtration and sulphuretted hydrogen be passed through the filtered solution to separate a portion of the precipitate remaining, this coloured liquor, when the sulphuret of lead has been removed, will be changed to a green when a solution of the sulphate of iron is thrown into it. Its colour will also become darker with solutions of ammonia; and chlorine will produce a precipitate without destroying all the colour. The precipitate thus produced is of a dark yellow. Hydro-chlorate of tin and the tincture of galls act energetically on the solution above alluded to; the latter, no doubt, in consequence of the presence of morphia. The best method to be pursued, in order to obtain morphia from tinctures, or solutions of opium, after their union with saccharum saturni as a precipitant, as also the peculiar situation of narcotine when the acetate of lead is used, will be introduced subsequently.

Having succeeded nearly two years since in obtaining morphia in a crystalline form, and in a state almost pure, by immediate precipitation from a combined acetic and alco-

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\* Thenard, *Traité de Chimie*. Tom. V. p. 236.



holic solution, a process for its production was presented to professor Barton for publication, in October 1827, in an appendix to the synopsis of his lectures on materia medica. The outlines of the process were also published in the North American Medical and Surgical Journal, in the fifth volume\*. The peculiarities distinguishing the process above alluded to from the numerous other methods devised by pharmaceutists for the preparation of that important proximate principle morphia, are the solution of the morphia as it is combined in opium, in alcohol, and acetic acid, and the suspension of the colouring matter and other inert substances, copiously thrown down by every other process. It was not supposed that the process in the form there detailed resulted in the production of all the morphia contained in opium subjected to it; no method heretofore devised has attained that object. The morphia inevitably lost by repeated washings, by alcohol and water, of heterogeneous precipitates in other processes, remained probably in solution, in the alcohol too copiously used in that.

The effectual suspension of the colouring matter and resin in an acetic tincture, highly charged with the latter, (the resin,) and the satisfactory precipitation of the morphia, in crystals, led to further experiments, with solvents so modified as to preclude, in part, the resin, subsequently introducing a smaller quantity of alcohol, to suspend the colouring matter and other inert substances soluble in water or diluted vegetable acids. Following the above suggestions, it will be seen by the details to be made, that a very large and satisfactory product will result, and that a little practice will enable persons with moderate chemical skill, and an apparatus of a very humble order, to prepare the most important of the substances in opium.

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\* M. Chevallier repeated the experiments alluded to, and communicated them to the section of pharmacy of the French Academy of Medicine in July last. He obtained a greater quantity than was there mentioned. Vide Vol. V. of the North American Medical and Surgical Journal.

The best opium, in a state of perfect dryness, is readily dissolved in water by a protracted digestion, in a temperature of about 70° Fahr. That of medium quality, which in commerce is far more abundant than the superior kind, requires, for its successful treatment, diluted vegetable acids, while inferior opium, especially if contaminated by admixture with substances readily acted upon by the two solvents before named, demands the use of alcohol, either alone, or in combination, as the first solvent. When alcohol is employed alone, or in combination, as the first solvent, the resin should be removed in a manner subsequently to be noticed, in order satisfactorily to produce the morphia. It is the resin present in the alcoholic solution, employed according to the formula of M. Guillermond\*, that highly contaminates the precipitate thus obtained, and constitutes the objection to his process. M. Guillermond highly enforces the employment of the method alluded to above, as a convenient plan for the examination of opium; having succeeded in the production of a satisfactory quantity of morphia from half an ounce of this drug. The commendation which he has given of his process, for the analysis of small portions of opium, applies with more force to the more simple plan subsequently to be related, by which twenty grains of opium, and even less, are sufficient to display its simplicity.

One thousand grains of opium, in pieces of the size of a nutmeg, sufficiently dry to be readily broken, were digested with occasional stirring in eight ounces of distilled water, during six days, in a temperature of from 60° to 70° Fahr. The solution was then thrown upon a coarse paper filter, previously washed and moistened with pure water, when a highly coloured transparent liquor was obtained, measuring six ounces and a half, of specific gravity 1043. This solution was combined with six and a half ounces of alcohol, of 35° Beaumé; its transparency was unaffected, and the temperature of the combination rose eight degrees; conden-

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\* Journal de Pharmacie, No. VIII. Aout 1828.



sation also took place of 49 into 48 parts. Immediately after the combination of the solution with alcohol, two drachms of aqua ammoniæ, of specific gravity 950, united with six drachms of alcohol of 35°, were thrown in and intimately mixed. No visible change took place, except that the colour became rather darker; but in the course of half an hour crystals began plentifully to form. After a few hours had elapsed, two drachms more of aqua ammoniæ, similarly combined with alcohol, were thrown in, and the whole suffered to rest twenty-four hours. The crystals then, separated by a filter, and washed with a few ounces of pure water, weighed\*, when dry, one hundred and thirty-eight grains. The crystals were uniform in appearance, a little darker than nankin colour; when tried with nitric acid, they assumed the colour of arterial blood, and nitrogen was disengaged. The dregs of opium remaining on the filter were washed with four ounces of pure water, passed and repassed through several times, until it no longer acquired colour. A solution much lighter than that obtained by the first filtration was the result, of specific gravity 1013. This solution was combined with one ounce and three-fourths of alcohol of 35°. One drachm of ammonia, of specific gravity 950, was united with three drachms of alcohol of 35°, and thrown in after a few hours. Another drachm of aqua ammoniæ, similarly united, was also thrown in, and in twenty-four hours the crystals were collected, washed, dried, and tested. They were uniform in appearance, weighed twenty grains, and, like the first described, were changed to red by nitric acid. The dregs still remaining on the filter were digested in alcohol of 35° for several days in a temperature about 70°;

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\* Opium of very superior quality, when thus treated, afforded about eighteen drachms of precipitate to the pound of opium, and this about fifteen drachms of morphia. Several physicians have used the first precipitate with much satisfaction.

M. Robiquet only obtains seven drachms from the Paris pound by his process, and that from the best opium.

Mr Brande, from a carefully prepared specimen of English opium, obtained eight drachms.



the amount of alcohol eight ounces. The alcohol was removed by filtration, and the dregs washed with two ounces of alcohol several times passed through, to remove all the colouring substance, &c. dissolved. This highly coloured tincture was reduced by distillation to two ounces, and the resinous substance, &c. insoluble in water, separated by six ounces of that fluid cold. When filtered a very dark substance remained upon the filter; the solution slightly alcoholic was of a transparent light brown colour; about half its bulk of alcohol was added, and ammonia to the amount of two drachms of the water of specific gravity 950 combined, as in the former experiments. A crystalline substance was obtained which by merely washing with water became nearly white. When tried with nitric acid it dissolved slowly, became of a light yellow, and nitrogen was not disengaged in perceptible quantity. The amount obtained did not exceed twenty grains. It proved to be a vegetable product only, and without doubt narcotine.

Two hundred and fifty grains of opium, similar to the subject of the last experiment, were digested six days in two ounces of common distilled vinegar\*, in a temperature about 55°; afterwards it was filtered and treated in all respects according to the first of the three stages of the preceding experiment, and the dregs washed with a small portion of diluted vinegar. The specific gravity did not essentially differ from the watery solution in the previous experiment. An additional quantity of water of ammonia was used to saturate the acetic acid. The result of this experiment was thirty-five grains of crystals uniform in their appearance, of a nankin colour, and when tried with nitric acid becoming red, with other marks of morphia.

Five hundred grains of opium of medium quality were digested in two ounces of distilled water until entirely bro-

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\* Instead of distilled vinegar citric or tartaric acid may be used:—80 to 120 grains are sufficient for 1000 grains of opium. Strong acids cannot be substituted, as their action is too energetic on resinous substance, &c. in opium.

ken down ; then three ounces of distilled vinegar were added and the digestion continued several days. Upon filtering the coloured acidulous solution and treating it in all respects as the subject of the last experiment, fifty-six grains of crystalline precipitate of a nankin colour were obtained, similar in their characters to the other precipitate of the same colour.

The precipitates procured by either the watery or acetic solvent may be rendered white by solution in boiling diluted alcohol\*. Five parts of alcohol of 35° to three parts of water will be found to answer better than more concentrated spirit. The crystals have a better appearance when diluted alcohol is used than when alcohol of 35° is employed. I have obtained from the nankin coloured crystals five drachms of pure morphia from six drachms, without selecting the portion deposited from the alcoholic mother liquor, which does not yield all it holds in solution for several days; the quantity however thus remaining dissolved is inconsiderable.

A more convenient and satisfactory method of rendering the morphia pure and white will be found in the solution of the coloured crystals in diluted alcohol, slightly acidulated with sulphuric acid. Four ounces of the liquor will suffice to purify two drachms. The liquor should be heated to facilitate the complete solution. Weak ammonia in a small portion of diluted alcohol may be added while the fluid is quite warm.

The colouring matter and other inert substances taken up by water when pure opium is the subject of experiment, and by any diluted vegetable acid, when that of an inferior grade is to be treated, are effectually suspended by the aid of a small portion of alcohol. The ammonia, when introduced in the attenuated form recommended, seems also to favour the effectual suspension of a coloured substance

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\* The apparatus of professor Hare for filtration at a boiling heat will be found very useful in purifying morphia. Vide his *Chemical Compendium*.

which gradually forms and precipitates as the excess of ammonia escapes; especially when water alone has been employed as the solvent, this precipitate naturally forms in two or three days after the morphia has been separated.

Ammonia or any other alkali, when thrown into a solution of opium in a form sufficiently concentrated to act with energy, exerts itself more upon the colouring matter than upon the solvent of morphia, and this latter substance may be obtained from the supernatant liquor as well as the precipitate. It may perhaps be remarked that alcohol will also be liable to objections on account of its power as a solvent of morphia. Cold alcohol acts very feebly on uncombined morphia, and when saturated with colouring matter, its solvent power is scarcely appreciable; the less soluble substance (morphia) being the more effectually precipitated in consequence of its presence. It may be further remarked that by concentrating the solution of opium in the manner directed by M. Robiquet, the loss attendant on the supernatant liquor still holding morphia may be obviated; and by reference to the formula of that distinguished chemist, it will be seen that he directs the preparation of an extract from the supernatant liquor, which he considers still to possess some of the virtues of opium. When lime has been employed as a precipitant of morphia from the diluted hydrochloric solution of opium, in order to obtain a satisfactory result it has been found necessary to precipitate the excess of lime by carbonic acid gas.

Besides the advantage of more effectually precipitating the morphia by suspending the colouring matter, &c. another of scarcely less importance is attained, viz. the effectual solution of more colouring matter by a smaller quantity of alcohol than would be sufficient to dissolve colouring matter unaltered by precipitation. But is the colouring matter unaltered by precipitation when caustic alkalies are used? It seems to be essentially altered, and rendered much less soluble by the energetic action of alkalies; and this will explain the great difficulty in its removal in order



to obtain the morphia pure, when according to all previous formulæ it has been precipitated; it will also throw some light on the source of loss generally admitted as unavoidable in the preparation of morphia. From that which precedes it will be seen that water acts energetically as a solvent of pure opium even in very limited quantity, that acids frequently assist the solvent, and that very inferior opium often demands the aid of alcohol as the first solvent. In the latter case it will be well to submit the opium to its action in the following manner. One part of opium to one part and a half of water for two or three days until it has become broken down, then add about six parts of alcohol of 35°. After a further digestion for three or four days, with frequent stirring, filter and wash the dregs on the filter with two ounces of alcohol several times passed through; then concentrate the tincture to about one third its bulk by distillation, and separate the resin by about six ounces of pure water. After the resin has subsided, add alcohol to suspend the colouring matter, and proceed to obtain the morphia in the same manner as when water or diluted acids have been the first solvent; if the resin is not removed as has been before remarked, the product will be much contaminated by impurities.

#### *Narcotine.*

It has been shown that when opium is treated by a small quantity of water, nearly if not quite all the morphia is dissolved, while a portion of narcotine is retained in the dregs of the opium, and may be from them obtained by the aid of alcohol. It may also be obtained by evaporation when opium has been dissolved in a large quantity of alcohol and the resin separated in the manner directed in the treatment of inferior opium. After the resinous substance has been thus removed the narcotine\* will crystallize and fall down when evaporation is pursued sufficiently. The morphia in

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\* Thus form the salt of Derosne.

this case remains in solution intimately united with the colouring matter, while the narcotine crystallizes in the highly coloured menstruum comparatively free of colour. This illustrates the opposite characters of these two important substances.

Narcotine may also be obtained by the use of ether after the method adopted by professor Hare or that of M. Robiquet, and by the aid of oil of turpentine as the following experiment will show.

One part of opium, perfectly dry and in fine powder, was thrown into sixteen parts of oil of turpentine heated to  $212^{\circ}$ , at which temperature it was retained, with frequent agitation, thirty minutes. The oil of turpentine was then separated by filtration, and it had acquired a light brown colour. When submitted to distillation, and united with alcohol, to favour the separation of the turpentine from the substances it had removed from the opium, and reduced to about four ounces, half of which was alcohol, upon slowly cooling, crystals of narcotine formed in the retort. Besides the narcotine, oil of turpentine also removes from opium a small quantity of coloured resin. Morphia may be readily obtained from opium after its treatment with oil of turpentine, as above stated.

Narcotine is dependent for its solution, in the state in which it exists in opium, upon some substance removed or altered by the addition of acetate of lead. From the tincture and solution, copious precipitates were produced by a solution of the acetate of lead. By removing the excess of precipitant, or charging the new compound formed with sulphuretted hydrogen, crystals of narcotine collected on the sides of the vessel. Narcotine was also obtained from the sulphuret of lead, by digesting it in ether. It seems, from the latter fact, that narcotine forms a soluble compound with a solution of acetum plumbi, from which it separates when sulphuretted hydrogen is introduced.

## Minutes of the College.

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30th December, 1828.—An essay on copaiba, by Elias Durand, was read and referred to a committee for examination.

A report was read by the committee appointed at the last meeting to inquire into the expediency of opening a loan for \$ 1000, for the purchase of chemical and pharmaceutical apparatus for the use of the lectures, which was not acted upon.

27th January, 1829.—The committee to whom was referred the essay on copaiba reported in favour of its publication; and “observe, with respect to the consolidation of this oleo-resin, that it is not only necessary the article should be pure, but that the magnesia be absolutely deprived of carbonic acid. If the latter have not been recently calcined, it is necessary, in order to secure the desired result, that it be subjected to a red heat for five or ten minutes in a crucible, and mixed with the copaiba immediately after it becomes cold.”

The report of the committee in favour of opening a loan for \$ 1000 was adopted, and the following is extracted from its preamble:

“The committee, to whom was referred the subject of the propriety of purchasing an additional chemical apparatus, report,—that having attentively examined the subject, they are of opinion that the interests of the college are inseparably connected with the respectability of the school of pharmacy, and that it is to the influence which it will exert by means of this school, that the college is to look for the principal sources of its future prosperity and importance.



The advancement of the means of instruction is therefore a duty which the college, if it regard its own interest, can never overlook. Every opportunity should be seized for impressing upon the apprentices the necessity of attending the lectures, and of rendering the lectures more useful and popular. As the experimental illustrations of the science of chemistry form one of the most attractive and instructive exhibitions that modern science affords, your committee think they cannot too earnestly recommend the adoption of measures to place the lectures of this department on a footing of equality with those of our best colleges and schools. The apparatus now employed is not only clumsy and imperfect, but the lecturer is obliged to pass over, without illustration, some of the most interesting and important topics on which he descants. Had he at his disposal a proper collection of apparatus your committee feel assured that the immediate effect would be an increase in the class from the ranks of the medical students and amateurs, whose matriculating fees would contribute towards paying for the expenses incurred. Your committee have consulted with the professor of chemistry on the subject, who has furnished them with a list of apparatus which he thinks necessary; the cost of which as far as can be ascertained by a rough estimate will not exceed one thousand dollars. The Philadelphia College of Pharmacy has now been in existence for more than eight years; during that period it has with slender funds and through many discouraging circumstances effected more for the improvement of American pharmacy than all that has before been done or attempted in this country. It has produced union and concert, a more liberal spirit, and more elevated views among the apothecaries of Philadelphia; it has had the honour of establishing the first school of pharmacy which this country has seen; it has established the first and only journal devoted exclusively to the science and art of the profession; it has resolved a company of shopkeepers into a scientific association, the inspiring influence of which we are just beginning to feel; it has

founded a valuable professional library; and, more than all, it has educated a race of young men, with more accurate science, and more extensive knowledge, than their predecessors, and who are just coming upon the stage of action, and enrolling themselves as members of the institution, which they must regard as their alma mater, in whatever part of the world their future lot may be cast.

“It is from the combined influence of all these causes that your committee anticipate a more prosperous era in the history of the college, a more cordial co-operation, and more efficient and liberal support.

“With these views the present appears to the committee the proper time for attempting to make another great step towards the accomplishment of our views.”

*24th February, 1829.*—A report from the committee appointed to examine Samuel Allison’s essay on the “protoxide of mercury, and the atomic weight of that metal,” was adopted, and the essay referred to the publication committee.

An essay upon morphia and narcotine, by Dr Staples, was read and referred to a committee.

*31st March, 1829.*—The following gentlemen, whose names were proposed at last stated meeting, were duly elected foreign honorary members of this college, viz: Messrs Vauquelin; Derosne; Robiquet; Virey, M.D.; Pelletier.

The committee to whom was referred the essay of Dr Staples reported in favour of its publication.

A report from the publishing committee was adopted, and the committee directed to proceed to the publication of the Journal, with the present number of subscribers.

The following gentlemen were duly elected officers, trustees, &c. for the ensuing year:

*President*,—Daniel B. Smith.

*Vice Presidents*,—Dr Samuel Jackson, Henry Troth.

*Secretary*,—Charles Ellis.

*Treasurer*,—Edward B. Garrigues.

*Trustees*,—Alexander Fullerton, Jr; Elias Durand; William Biddle; Joseph Reakirt; Warder Morris; John Carter; Charles H. Dingie; William Marriot; Samuel P. Griffiths, Jr, for the unexpired time of Henry Troth elected Vice President.

*Publication Committee*,—Benjamin Ellis, M.D.; Daniel B. Smith; Samuel P. Griffiths, Jr; George B. Wood, M.D.; Charles Ellis.



## Miscellany.

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### *Medico-Botanical Society.*

The last general meeting of the eighth session of this society was holden on Friday the 11th of July, at its apartments 32 Sackville street, Piccadilly; Sir James M'Gregor, M.D. F.R.S. President, in the chair.

The following gentlemen were elected to be professors during the ensuing session:

Professor of Botany, John Frost, Esq. F.R.S.E.; professor of Toxicology, George Gabriel Segmond, M.D. F.S.A. F.L.S.; professor of Materia Medica, John Whiting, M.D.

A paper entitled "remarks on the doubtful identity of *bonplandia trifoliata* of Willdenow, and Humboldt and Bonpland, and the *Angostura* or *Carony* bark tree," in a letter addressed by Dr John Hancock to the president and fellows of the society, was read.

Dr Hancock who, during the year 1816, resided for several months in the district in which grows the plant yielding the bark known in pharmaceutic language by the name of *cortex Angosturæ vel cuspariæ*, and directing his attention to this subject, discovered several material discrepancies between the tree he observed, and the description of a tree said to produce the drug, and of which baron Alexander Humboldt, in other respects such an accurate observer, sent specimens obtained from *Carony* to professor Willdenow, of Berlin; who, though there already existed a genus of that name, called it *Bonplandia*, in honour of baron Humboldt's companion. This name was subsequently adopted by Hum-

boldt and Bonpland in their splendid work on equinoctial plants, though the former had previously given it the appellation of *cusparia febrifuga*. The opinion formed by Dr Hancock was confirmed, on being informed by a gentleman of the name of Don Jose Zereas, with whom the travellers above mentioned lodged, that they did not visit the missions of Carony, but sent down an Indian, who returned with a sample of the leaves of the tree in question, but much to their disappointment, without flowers. The generic character having also become very doubtful to Dr Hancock, he carefully examined its congeners, and found it agree in so many points with genus *galipea* of Aublet, that he considered it to be a species thereof, and in his opinion he has lately been confirmed by the arrangement of professor De Candolle, who has classed the *cusparia febrifuga*, which no doubt, is nearly allied to Dr Hancock's plant, under the head *galipea*. The paper then gave a detailed description of its botanical characters; which, with the figure of the plant and the notice of its great efficacy in several diseases, especially in malignant fevers, dysenteries and dropsies prevalent in Angostura in 1816 and 1817, will be published in the next number of the society's transactions, together with a comparative statement of the differences existing between *bonplandia trifoliata* (Willdenow) vel *cusparia febrifuga* (Humboldt and Bonpland) vel *galipea cusparia* (De Candolle), and the real Angostura bark tree; the most striking of which is, that instead of being a large and majestic forest tree as described in the *Plantæ Æquinoctiales Orbis Novi*, the authors of which no doubt thought the tree found by them in the neighbourhood of Santa Fe de Cumana and Nueva Barcelona was the same as that of which they obtained leaves in Angostura, it is a tree, or almost shrub, of not more than twelve or fifteen, and at the most of twenty feet in height, and four or five inches in diameter. The Doctor concludes by proposing that the plant described by him should be named *galipea officinalis*.

The paper was accompanied by five native specimens of

the bark, leaves, flowers, capsules, and seeds of the plant. The thanks of the meeting were ordered to Dr Hancock, for this very interesting communication.—*Late English Jour.*

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*On the Means of ascertaining the Purity of Sulphate of Quina. By R. Phillips, F.R.S. L. & E. &c.*

The great demand which has arisen for this important medicine, and the high price at which it is necessarily sold, have excited some, who are careless as to the means by which they acquire gain, to sophisticate it in a vast number of ways, and by every means which talent misapplied could suggest.

Having repeatedly of late been requested to examine various samples of sulphate of quina, I thought it might be useful to state the several modes which may be employed for that purpose: and I make the present communication with the greater confidence, because I have received the very able assistance of my friend Mr John T. Barry, of Lombard-street, to whose chemical skill, and the opportunity of frequently applying it, I am indebted for the greater number of hints and facts detailed in this paper.

Pure sulphate of quina has the form of minute fibrous crystals, it is inodorous, and its taste is bitter. If certain vegetable products, such as starch or sugar, be mechanically mixed with it, they may possibly be observed by merely inspecting the preparation with a glass.

1st. If the sulphate of quina be mixed with a considerable proportion of foreign matter, it may probably be detected by dissolving the salt in question in about three hundred times its weight of water,—say one grain in about five fluid drachms of boiling distilled water. On cooling, pure sulphate of quina will be deposited in feathery crystals in twenty-four hours, if there be no adulteration.

2dly. As indirect, but as good collateral evidence, the taste of sulphate of quina of known good quality may be



compared with that of another sample. Thus, when pure, a grain of sulphate of quina will render nearly a pound and a half of water, or 10,500 grains, sensibly bitter.

3dly. The alkalies, either pure or their carbonates, if but slightly in excess, always occasion precipitation at ordinary temperatures in a solution of sulphate of quina containing only 1-1000th of its weight, or less than one grain in two fluid ounces of water.

4thly. A solution of tannin occasions a very sensible precipitate in an aqueous solution of sulphate of quina, containing only 1-10,000th of its weight of the salt, provided there be no acid in excess. Kino is that form of tannin which best answers the purpose. It is, however, to be observed, that the salts of morphia, cinchonia, strychnia, &c. are similarly affected by tannin; but they are not likely to be mixed with sulphate of quina.

5thly. Sulphate of quina suspected to contain sugar, gum, or other substances soluble in cold water, may be tried by digesting the same portion of the salt in small and successive portions of water to saturation. If the sulphate of quina be pure, and the solutions all properly saturated, they will have the same taste and specific gravity; and similar portions will yield by evaporation equal quantities of solid residuum.

6thly. A repetition of the above process, substituting alcohol for water, answers for extracting resin and some other substances, because sulphate of quina is soluble in alcohol to only a limited extent.

7thly. If a white substance insoluble in cold water be found in the sulphate of quina, heat the mixture to about 170° of Fahrenheit. This will render starch soluble, and its presence may be determined by the addition of an aqueous solution of iodine, which will immediately occasion a blue colour, and eventually a blue precipitate. The iodine should be added in very small quantity\*.

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\* William R. Fisher, a junior apothecary of this place, states that the iodine must also be added very *slowly*. If it is not added "slowly, and in small quantities," the experiment fails.—*Ed.*

8thly. Sulphate of quina has been adulterated with ammoniacal salts. These are rendered obvious by adding a little of the suspected salt to a solution of potash. If any ammoniacal salt be present, ammoniacal gas will be readily detected, either by the smell, or by holding over the mixture a piece of turmeric paper or a bit of glass moistened with acetic acid.

9thly. To ascertain whether sulphate of quina contains any earthy salts, such as sulphate of magnesia or sulphate of lime; burn a portion of it in a silver or platina crucible, or even in a clean tobacco-pipe. Any earthy salt, or any matter indestructible by heat, will of course remain in the vessel.

10thly. To ascertain that the sulphate of quina contains the proper quantity of sulphuric acid and quina, dissolve a little in pure muriatic or nitric acid, and add a solution of muriate or nitrate of barytes: 60 parts should give about 17.3 to 17.4 of sulphate of barytes; or the method may be varied without the trouble of drying the precipitate. Dissolve 60 grains of sulphate of quina in water slightly acidulated with muriatic or nitric acid; add a solution of 18 grains of nitrate of barytes, and separate the precipitated sulphate of barytes by filtering. If nitrate of barytes be now added to the clear solution, it should still occasion slight precipitation, for 60 of sulphate of quina contain 5.8 gr. of sulphuric acid, equivalent to 19.1 of nitrate of barytes.

This test is only to determine that there is no crystallized vegetable matter uncombined with sulphuric acid in the sulphate of quina; the detection of earthy or alkaline sulphates has already been provided for.

11thly. Sulphate of quina should lose not more than from 8 to 10 per cent. of water by being heated till deprived of its water of crystallization. Mr Barry informs me that he once examined a sample which contained more than 40 per cent. of water in excess diffused through it.—*London Philosophical Magazine.*



*An Account of the Cultivation of Sago in the East.*

With the view of expatiating on the rise and progress of this commodity, which, about forty years ago, was almost entirely unknown in a European market, except medicinally, being recommended as a restorative in phthisis and emaciations, we shall commence by describing the nature of the soil and situation which is favourable to it, the progress of vegetation, and the expenses of bringing it to market in its crude state ; and subsequently enter into a detail of the process of refinement as practised here, remarking on the cost of labour and profit of manufacture attending its refinement from the first stage to what is called pearl sago, with statements of the import of the farinaceous pith or medulla, and export of the refined pearl sago, with the various uses to which it is applied, and such general remarks as present themselves for consideration.

Growing in an almost wild state, in many places in our immediate vicinity, it claims our particular attention—in the first place, as an article of considerable export ; and, secondly, to use Dr Johnson's definition of it, as “a kind of eatable grain,” increasing in demand, improving in quality, and in the manufacture of which, Singapore, within the last year, has not only surpassed in quality, but exceeded in quantity, that of any other place.

In his “Indian Archipelago,” Crawfurd says, Sago is an article of exportation to Europe,—to India, principally Bengal,—and to China. It is in its granulated form alone that it is ever sent abroad. The best sago is the produce of Siak, on the north coast of Sumatra. This is of a light brown colour, the grains large, and not easily broken. The sago of Borneo is the next in value ; it is whiter, but more friable. The produce of the Moluccas, the greatest in quantity, is of the smallest estimation. The cost of granulated sago, from the hand of the grower or producer, is about twice the price of rice in Java, or a dollar a picul. In the market of Malacca, the sago of Siak may be had at from two to three dollars per



picul. The sago of Borneo has been sold to the European merchant, in Java, as low as one dollar and three-quarters a picul. The foreign exporter will be able to ship the former at from three dollars and a half to four dollars and a half per picul. It may here be worth mentioning, that, within the last few years, the Chinese of Malacca have invented a process by which they refine sago so as to give it a fine pearly lustre. Not above four or five hundred piculs of this are manufactured. It is thought that it may be obtained at about six dollars per picul, when the supply is more equal to the demand. A small quantity of it exposed for sale in the London market, in 1818, sold for about thrice the price of ordinary sago.—Vol. iii. page 348. And he describes the sago palm, (*metroxylon sagu*), as a native of that portion of the Archipelago in which the easterly monsoon is the boisterous and rainy one—as the eastern portion of *Celebes*, and Borneo; to the north of Mindanao, to the south of Timur, and to the east of New Guinea, and says, that the great island of Cerum is of all others most distinguished for its production. He doubts it being indigenous in the western parts of the Archipelago, and draws some curious and interesting inferences from the various designations under which the sago palm is distinguished in the different languages of the islanders, tending to prove that in the western parts it is an exotic. He gives a sketch of the sago harvest, and the modes of preparing the *farina* for consumption, with the various economical uses to which the different portions of the sago palm are applied, at some length, and winds up with the rough estimate of an English acre yielding 8000 pounds of raw meal a year.—See vol. i. page 383 to 393. We do not pride ourselves on our skill in botany, and submit quietly to be led in the term (*metroxylon sagu*) given to the palm tree, called *rumbiya* by the Malays of this part of the world, which produces the pith, afterwards manufactured into sago; though we are not obliged to confess that we are led blindly, inasmuch as the latest work we have had it in our power to consult calls sago the production of the *cycas*

*revoluta*, and the "Encyclopædia Britannica" has it the *cycas circinalis*, a genus of plants, however, classed by Linnæus first among the *palms*, and afterwards amongst the *ferns*; so far we may be allowed to admit that which we cannot confute; this knotty point settled, we may proceed to business, and, for the sake of perspicuity, will divide the subject into two parts, and speak first of the crude, then the refined state. *Its crude state.*—First,

Low marshy situations, shut out, but at no great distance from the sea, and well watered by fresh water, seem most productive. The soil in such situations, to the depth of several feet, is generally a flaccid mould, composed chiefly of decayed vegetable matter, and extremely pervious to water; below the above depth, a stratum of marine formation generally exists. According to Raffles, on Java, this tree is found only in a few low and marshy situations, and the preparation of sago "from the pith is not known to the inhabitants." Marsden says, that sago is but little used by the Sumatrans; and Crawford, as we have before stated, presumes that in this, or the western part of the Archipelago, the sago palm is an exotic. Our inquiries have been unavailing in the attempt to discover it as indigenous in our neighbourhood, and we feel confident that it does not exist in the native wild state to the eastward of Borneo.

The best sago produced in our vicinity is from the islands of Appong and Panjang, which form the east bank of Brewer's Straits, or properly Salat-Panjang; and next in quality is that from the rivers Mandha, Katuman, Goung, Egal, Plandok, and Anak Sirka, lying between the Campar and Indragiri rivers, on Sumatra, or Pulo Percha as it is called by the Malays. Of least value is the produce of the islands of Burn, Ungah, and Kundor, in the Straits of Dryon or Salat Duri. The sago palm is found in several other places, in small quantities, but seldom cut down by the lazy possessors of it, to whom it probably descended through a long line of equally sluggish ancestors, from some *Inchi* of *Zamandaulu*, who had better notions when he planted it.



The nature of the soil in the places we have mentioned is very similar, all of them deep bogs, next to impassable to one unaccustomed to such walking.

Cutting down and burning the jungle is all the preparation required previous to planting the palm, which is best done from the seed, a small black nut, about the size of a pullet's egg, at about five fathoms apart.

Plantations have been tried from the suckers, but the injury sustained by their roots in the separation from the parent stem, has invariably retarded their growth above a year.

From seven to ten years is the time it takes for the tree to bear fruit, when planted from the seed in the first instance; cutting down, for their pith, commences generally at about the age of six or seven years; after this period, the pith gradually loses its moisture, and is no longer fit for the purpose when the tree comes into bearing.

Sago is cultivated in large patches, divided into lots, the property of individuals, and as much as one man, his wife and family choose to look after; I say choose, because it is not as much as they *could*, if they *would* attend. One man, as above, can manage 100 fathoms square; upon this he plants 400 seeds, and subsists himself for the first six or seven years on his means, not unfrequently leaving the trees to take care of themselves, until he can commence cutting; from that day the supply is constant; each tree throws out from ten to twenty suckers, which increase so rapidly that the owner is obliged to thin them constantly; a good tree yields from forty to fifty tampins, and the worst ever cut down about twenty-five; this is on Appong. The tampin of Appong is to that of Mandha as four is to five; and is a rough measure made of the leaves of the sago tree, of a conical form, twenty to thirty inches long, with a base of about eight inches diameter: both ends of this are stuffed with the refuse pith, to prevent the escape of the *farina*; and the tampin of Appong holds, on an average, nineteen



pounds avoirdupois; thus seven tampins very nearly equal a picul of this place, or  $133\frac{1}{4}$  lbs. avoirdupois.

It will be needless to speak of the sago of each place, differing but a little in quality, and in the measures they are sold by, as the acuteness of the Chinese brings them all to their level on arrival here. One remark on the stupidity of the cultivators may be noticed, viz.—one hundred tampins of Appong may always be purchased on the spot, cheap or dear, at other places it matters not, for 6 1-4 reals, or Spanish dollars, 5. 12, as a Spanish dollar or a real is the same thing with them, and both go alike for 246 doits or 82 cents of a Spanish dollar of Singapore: if the person in quest of sago takes doits, they must be of the small kind but thick. At Mandha, on the same principle, the same number of tampins may be had for Spanish dollars, 9. 61. Now the Appong measure yields 14 piculs, 29 catties, and the Mendha 17 piculs, 86 catties; a difference against Appong, of Spanish dollars, 2. 51, and all because they say it has been the *adat* or custom to sell it so!

One person is sufficient to clear the underwood away, as it grows up in every lot of 100 fathoms square. The whole family are, however, fully required when at times they cut down for manufacture, which is always done on the spot where the tree is felled. They prepare the number of tampins, or measures, required for the reception of the sago, in the first instance, and put them out to dry: they then fell the tree, and split it in halves by means of wedges, build a temporary house over it, and dig out the pith with hoes made from the rind of the tree; this they carry up into the house, the floor of which is latticed so close, as just to allow the finer parts of the medulla to pass through, on being wetted with water and trodden by the feet; into this house the produce of the trees is brought, two or three at a time, and all the finer parts are carried down by the water into the trunks of the trees, three or four feet in diameter, which are cleanly hollowed out, and left below to receive it. In order that no waste may take place, they lead a mat, made also of

the leaves of the palm, from the floor of the work-shop down into the shells of the trees, and this carries the water without spilling any: they trample it until the water passes through clear of the farina, and then throw away the refuse, keeping sufficient merely to stuff the ends of the tampin. By the next day the medulla has settled in the trunks of the trees, leaving the water at the top; this is drawn off, and the sago flour thrown, in its wet state, into the tampin already prepared, and left to strain itself: some refuse pith is then put on the end before left open, the base of the cone, and the work is done. The shell of the tree is then cut up for fire-wood, or in slips, and thrown into the marsh to prevent the poor devils going quite over head, in carrying down the sago to boats waiting for it. This is always their duty, for if the Malays, who come to purchase, could not get this included in their agreement, the chances are, they would go elsewhere in search of the sago. Sago once made is obliged to be kept wet, or it would spoil in a few days; again, kept constantly wet, the tampin leaves soon rot; cultivators cannot, therefore, keep a stock ready but at a greater risk than these savages choose to undergo. They have a method of frying the meal over the fire, called there *sagu randang*, which sells for a real, or 82 cents, of a Spanish dollar, for sixteen of their gantongs are equal to twenty of Singapore or one picul. This, however, will not keep long—as damp throws it all into a glutinous mass, and in a short time spoils it, and it may easily be supposed that their situations are not *very dry and airy!* At Appong, the sago is made by Orang Utan, or people of the woods, who speak a jargon of Malayan, are not Mohammedans, and eat the hogs, deer, &c. with which their island abounds; and the maritime Malays, who visit them for sago, are obliged to be always upon their guard, and not unfrequently wait two months for the cargo of a few hundred tampins; if they take money to purchase, they get it much quicker, but require additional caution in making advances. There are said to be about three hundred and fifty souls, and that the produce might be put

down at three thousand piculs a year. The most of these people are dependents of Siak and Campar; the chiefs of the former place exercising a system of extortion and rapine, enough to induce any other class of people less accustomed to desert the place. The cultivators in the other places are Malays, and much superior, though their exports are severally less, and trafficking with them is not so dangerous or uncertain.

Appong has three hundred and fifty souls employed, and could produce three thousand piculs; this would afford, under all the disadvantages at which they sell it, 1024 Spanish dollars per annum, a sum quite adequate to the demands for foreign luxuries of people who do not eat rice, and live upon the produce of their woods. The people of Siak were the chief importers of sago into Malacca, whence erroneously it got the name of Siak sago, described as the best by Crawford. Siak itself exports no sago.

Malays all agree that the cultivation of sago is the most profitable of agricultural pursuits, not yielding to even the cultivation of rice by sawurs, for once in bearing, the trees are *ad infinitum* equally profitable, and require little or no labour.

The miserable state of barbarism in which the cultivators of sago exist, puts all calculation at defiance; but we do not hesitate in saying, if any person would commence here—and there are many places peculiarly favourable to it, and of considerable extent—that the profits of an English acre, when the trees were once fit to cut, would amount, on a low estimate, to fifty pounds sterling per annum, after paying all expenses.

This, too, is a branch of agriculture that a European might engage in, without the certainty of being robbed, which pertains to the culture of spices, &c.



*Gauthier or Linen Plaster.*

R.—Plaster of diapalma,  
 Plaster of simple diachylon, āā ℥j.  
 Plaster of burnt or brown ceruse, ℥viij.  
 Powdered orris root, ℥iss.

Liquefy the three plasters together, and then incorporate the powdered orris root. Plunge into it, while it is melted, a piece of linen one or two feet long, and four or six inches broad, agitating it with a spatula until it be well impregnated. Then elevate it by the corners, and draw it through two straight wooden rulers, held by another person, for the purpose of depriving it of the superfluous plaster and rendering it uniform. After it is partially hardened by exposure to the air, place it on a smooth stone (oiled), and roll it with a smooth billet of wood until it becomes uniform and polished on both sides.

The plasters of which the above is composed are directed, in the same work, to be made as follows:

## Plaster of Diapalma—

R.—Litharge,  
 Olive oil,  
 Lard, āā ℥iij.  
 Water, q. s.

Put these substances together in a copper vessel, over a fire sufficiently strong to occasion a moderate ebullition, stirring them constantly with a wooden spatula, for one or two hours, or until the mixture assumes a dirty white colour. Water must be added from time to time, to supply the waste of evaporation, and when it has acquired a moderate consistence, add,

Sulphate of zinc, ℥iv. dissolved in water, q. s.  
 White wax, ℥ix.

The vessel must be retained over the fire until the wax is well liquefied, and all the water is evaporated; the latter event is known by the plaster ceasing to bloat or swell. In

consequence of the absence of water, it requires great nicety in the management of the fire towards the close of the operation; for if the heat be too strong or too long continued, it speedily changes colour, and becomes gray.

This plaster is considered by the French as useful in the treatment of violent ulcers. It is sometimes made into the consistence of ointment by mixing with it one-fourth of its weight of olive oil, and is then called cerate of diapalme.

The Simple Diachylon of the French differs but little from that usually kept in our shops; the latter, therefore, will answer every purpose in the composition of the Gauthier plaster.

Burnt, or Brown Ceruse—

R.—White ceruse, ℥j.

Olive oil, ℥ij.

Unite these bodies by a gentle heat, stirring them constantly, *without the addition of water*. When the ceruse is perfectly dissolved, liquefy in it

Yellow wax, ℥iv.

and form the whole into a plaster. The oil burns a little, and acquires a brown colour, from the absence of water.

The Gauthier plaster, or linen prepared from the above materials, resembles very much the celebrated Mahy's plaster, and has been successfully substituted for it by some of the practitioners of this place.

E.

### *Selections from Faraday's Chemical Manipulation.*

We commence in this Number with a series of extracts from the above work, which is a treatise of more practical utility in its particular line than any heretofore published. Its value consists chiefly in this, that it enters into details which others have thought below their notice, and which students

have been obliged to find out for themselves. We select the chapter on Cleanliness, which is as important in the apothecary's shop as in the laboratory. The very minuteness and seeming insignificance of the particulars into which it enters should commend it to our notice. The maxims which should be instilled into boys from the moment they enter the shop should be cleanliness—order, neatness, cleanliness. These are the great secrets of success in the business—without them learning and talents will be of little profit, and with them the most moderate abilities are sure of prosperity.

### *Cleanliness and Cleansing.*

Much as the chemist may soil his fingers during his experimental occupations, he will soon learn the great importance of cleanliness to the success of his experiments. The regular course of his operations causes many kinds of matter to pass in succession through his hands; and many of the substances which by mixture have exhibited the phenomena they were competent to occasion, and so far answered the purpose of the experiment, then become mere useless dirt. Their dismissal and entire removal when thus circumstanced, become necessary that they may not contaminate other bodies; and are as imperatively required, as was the care previously bestowed to prevent their contamination from extraneous matter.

It is this rapid change in the character and relation of the substances with which the chemist works, that makes a constant attention to cleanliness essentially necessary. The very bodies which at one moment are carefully retained in vessels that have previously been cleansed with the most scrupulous attention, become the next in the situation of so much dirt, from which the vessels must be cleansed as perfectly and carefully, before they can be fit for another experiment, as they were for the reception of the now rejected matter. The results of numerous experiments relative to testing bodies in solution by re-agents, are, in many cases,



dependent on the employing of clean vessels. For instance, a portion of water examined in glasses which have been carelessly washed, may occasion a slight precipitate with nitrate of silver or muriate of baryta, and thus seem to contain a sulphate or a muriate, when the cause of the precipitate may be nothing more than portions of salt adhering to the vessels.

In the same manner the purity of an acid or a test is not unfrequently affected by the state of the bottle containing it, or by the dirty condition of glass rods dipped into it, or of the funnels through which it has been poured or filtered, or of the vessels used in its transference; and sometimes it is contaminated by laying the stopper of the bottle containing it in a dirty place. Nor is it only that kind of dirt or impurity which gives an evident tinge to what it adheres to that is to be avoided, but also numerous colourless substances, as salts, solutions, &c.; and in a word, any thing which differs from the principal substance itself, and is at the same time liable to be dissolved or mixed with it.

In consequence of these liabilities, and their interference with experiments, it should be established as a general rule in the laboratory, that no apparatus, nor any vessel, (except such as may be destined to a particular use, and is as convenient when with a little previously adhering matter as if it were clean), be put away in a dirty state. All vessels or instruments when resorted to should be found fit for the nicest experiment to which they are applicable. Glass rods or stirrers should be preserved in a clean place; glasses on a clean shelf; and stoppers when taken out of bottles, should be laid upon clean glass surfaces. These attentions and regulations will be found always useful, at times essential. They are generally more requisite and influential in minute chemistry, than in large experiments; and in trains of research, than in the processes of the manufacturer.

*Cleansing of vessels.—Glasses.* In by far the greatest number of cases glasses are dirtied by moist substances, as precipitates or solutions; it is then advantageous to cleanse

them immediately upon throwing out the contents, and before the dirt can dry or harden. Rinsing will usually remove the whole of the dirt; or if it adhere it is but slightly, and immediately gives way when touched by a wire with moist tow. If it should resist this application, a similar wire with wet tow, aided by a little of the wood or charcoal ashes which are always lying at the bottom of some of the furnaces, will generally remove every thing. Sand should not be used for these purposes, as it cuts and roughens the soft flint glass, of which vessels are made in England; and at the same time that it injures their transparency, it renders them improper for several particular experiments of precipitation. When by any of these methods the dirt has been removed, the glass is to be well rinsed in clean water, turned upside down for twelve hours on a side shelf or table to drain, and then wiped. The wiping should be performed with a cloth in each hand, not only because a cloth is more cleanly than the hand, but that if the glass should break the hand may be defended. The cloths should never be in a greasy, resinous, or pitchy state; but so clean that without communicating any thing, they will remove all substances that can be wiped off. Laboratory cloths when clean, should be used, first for wiping glass, then for wiping tables or dirty apparatus, and being once so used, should not be employed for clean glass again until they are washed. Especial care is required in wiping glasses that the inside be thoroughly cleansed in every part, for it is with that part of the vessel that tests and solutions come in contact.

If the glasses be greasy they should not be washed, but in the first place wiped with tow to remove as much as possible of the grease, and then a dry cloth should be used, until the glass appears clean. Its surface should afterwards be washed with a little strong solution of alkali, applied by means of a wire and tow; this removes the thin film of grease remaining after the wiping, and the glass may then be rinsed, drained, and wiped, as before directed. A duster should not be used at random for these greasy glasses, lest it

should the next moment be applied to a clean vessel and communicate impurities to it; but one should be kept apart and appropriated for these purposes.

If the glass be soiled by resin, turpentine, resinous varnishes, or similar bodies, it should in the first place be washed with a little strong solution of potash, those places where the resin adheres being rubbed by means of a wire and tow, until the alkali has softened the whole, and rendered it soluble in or moveable by water. It is then to be washed, rinsed, and dried, as before. Or in place of alkali a little strong sulphuric acid may be used, and is sometimes even more advantageous: being poured into the glass or vessel, the latter should be inclined in various directions, so as to bring the acid into contact with all parts of the foul surface: it will become very black, and after a few minutes the resin, &c. will wash off, and the glass may be cleaned in the ordinary way.

Pitch and tar, when they adhere to glass, may in part be scraped off. A little strong sulphuric acid applied as above, will loosen and separate the remainder. Occasionally a little oil may be used; being rubbed on the soiled parts, it mixes with and softens these adhesive substances, so that they may be wiped off by tow, and then the glass is to be cleaned from the oil as before described.

*Tubes* are cleansed generally in the same manner as glasses. Wires with tow will be found very convenient in displacing solid and adhering dirt from their insides. They should be well rinsed twice or thrice, the tube being each time half filled with water, closed by the finger, and then well shaken. They may be turned upside down, and left inclining against each other in a corner to drain; after some hours they may either be wiped dry within by a cloth and stick, or what is perhaps more convenient, left with their mouths open to the air until the interior has become dry by evaporation, and then be wiped to remove any dust which may have entered. Tow is not a good substance for the removal of water from glass surfaces, and for tubes it is bet-



ter to use a long slip of cloth, two or three inches wide. Having introduced a few inches in length of this slip into the tube, the wire or stick is to be inserted, and the cloth thrust up to the extremity, so as to form an accumulation there; the rest of the tube will then be occupied by the wire or stick and a part of the slip of cloth. It will thus be found easy by a very little management, and a rotatory and longitudinal motion of the tube, to wipe every part of the inside clean and dry in an expeditious and perfect manner.

Long tubes open at both ends, which have become dusty, are easily wiped by pushing a loose pellet of cloth or tow up and down them by a long stick: or a piece of string, having a loop at the end into which some tow has been introduced, may be used to draw the tow through the tube, and thus to wipe it clean. This is a very useful mode of cleaning out bent tubes open at both ends; the end of the string may be readily passed through them, by attaching a little piece of wire to it, as a weight. The piece of string must be longer than the tube to be wiped, and the portions of tow used at first, should be such as will easily pass the angles; they may be increased in size by the addition of more tow if necessary.

*Evaporating basins* are very easily washed. The soaking tub is useful for the softening and removing of most substances which are likely to accumulate in them. Grease, resin, and similar bodies, may be removed by tow and damp ashes, or soft sand, or otherwise by a little strong sulphuric acid. When all dirt is removed, the basins should be rinsed, turned upside down to drain, and then wiped. It is advisable to clean the stock of evaporating basins belonging to the laboratory once every two or three months, with a little strong solution of alkali, both inside and outside, rejecting at such times those which have become useless.

*Flasks* are not so easily cleansed as the vessels already mentioned, from the greater difficulty of access to the interior, but bent wires will overcome many obstacles. Florence flasks are frequently oily when obtained from the

Italian or wine warehouses. They may be readily cleansed by putting a little strong nitric acid into each, and heating it over a lamp or sand-bath, after which every thing will wash out with water. Strong sulphuric acid may be used for the same purpose, being brought into contact with every part of the glass, without requiring the application of heat. Either acid is better than solution of alkali. If metallic matter adhere to the inside, a little nitro-muriatic acid introduced, and heated on the place, seldom fails of separating and removing the substance. When the impurity is loose or separable by water, the flasks should be well rinsed and inverted on a filtering-stand or retort shelf, left to drain for half an hour, then well rinsed out with distilled water, and again placed to drain.

When the impurity within flasks, globes, or similar vessels, adheres mechanically, and is not soluble in water, it may frequently be effectually loosened and removed, by introducing some coarse brown paper torn into fragments about an inch square, with water enough to half fill the vessel, and agitating the whole well. The pieces of paper will rub or break off dirt that has resisted the action of water alone, and most sediments or deposits may be thus removed. The addition of a few wood-ashes increases the effect.

Upon wiping the exterior of globular vessels, those which are thin, as Florence flasks, require care, lest they be crushed to pieces between the hands. It may be necessary to dry the interior of some of them, but others will not need it. When they are to be dried, they may be left on the retort shelf in the cupboard, or on the filtering-stand, with the mouth downwards, until the water within has evaporated; but as this will require some days or weeks, a more rapid method may occasionally be adopted. This is to warm the flask, so as to convert the water within into vapour, and then by introducing one end of a piece of glass tube, whilst the other is held by the hand against the nozzle of a pair of bellows, to blow out the moist air, and replace it by that which is dry. If the first warming be insufficient to convert

all the water into vapour, the flask may be heated a second time ; or if the flask be thick, and retain its temperature for some minutes, merely persisting in blowing air through, will gradually evaporate and remove the water from within.

Instead of using the bellows, the mouth will answer every purpose ; for if, when the flask is hot, the external end of the tube be put between the lips, it will be easy to throw air in from the lungs, which, though it contain moisture, is much drier than that in the flask. When the appearance of liquid within no longer exists, the moist air last introduced from the lungs is easily removed by drawing air out of the flask, through the tube, into the mouth ; other portions then enter to replace it, and the vessel is left filled with an atmosphere of ordinary dryness.

Six or eight Florence and other flasks should be kept ready for use on the filtering-stand ; the mouths of the rest should be covered up with paper, to keep the dust out, and be put aside until wanted. In thus guarding the mouth of a flask, retort, tube, or similarly formed apparatus, it is merely necessary to roll a slip of paper round the end, so that it shall project sufficiently beyond the edge, and then to fold or double this projecting part down, in such a manner as to close the mouth, and at the same time prevent the slip from unrolling.

*Bottles.* The bottles of the laboratory require constant attention and cleansing. They are liable to accidents and uses of all kinds, and are soiled by every species of matter in turn. Now and then the stoppers of bottles become fixed, in which case means of loosening them, successively increasing in power (but also unfortunately in danger), must be resorted to, until the stopper is removed, or giving way, is destroyed. One of the simplest methods when the unaided hands fail, is to tap the stopper alternately on opposite sides, with a piece of wood, as the handle of a bradawl or a chisel, the other part of the tool being held loosely in one hand, whilst the bottle is retained lightly at its lower part in the other. The light alternate concussions on the opposite



sides of the stopper, are often sufficient to destroy the adhesion between it and the bottle. This is indicated by the sound; for so long as the adhesion remains perfect, the noise made by the tap is as if the bottle and stopper were but one piece of matter; but the moment the stopper is loosened, however slightly, the character of the sound changes, becoming somewhat flatter and heavier, and then a few more taps complete the operation, and the stopper gives way to the hand. Before thus endeavouring to loosen the stopper, the thickness of the neck by which its upper and lower parts are connected should be observed: if that be very small, the force must be carefully applied; if strong, a little more liberty may be taken with it. If the stopper does not soon give way, this means alone will not be sufficient for its removal.

Another method of removing a bottle-stopper is to insert its head into a chink, and then endeavouring to turn the bottle with the hands. This kind of force is similar to that exerted by the hand upon the stopper, but is more powerful; and if the neck of the stopper break, the hand is out of the way of danger. An upright board, such an one as supports the ends of a set of shelves, should be selected in a convenient situation in the laboratory, and a vertical slit cut through it, about a foot in length, an inch in width above, but gradually decreasing in size, so as to be about the third of an inch at the bottom. The top of the hole may be about the height of the breast. This aperture will, in one part or another, receive and retain the head of almost any stopper, and prevent it turning with the bottle. Then by wrapping a cloth about the bottle and grasping it in both hands, the attempt to turn it round so as to move the stopper may be made, with any degree of force which it may be thought safe to exert. If the force be such as to occasion fracture, it will generally occur at the neck of the stopper, twisting the head from the plug. It is only when the bottle is wide-mouthed, the stopper consequently having great surface of adhesion, and the neck of the stopper is also very thick,

that there is any risk of the bottle breaking in the hand. But the force employed should never be carried so far as to cause fracture any where, but the attempt, if unavailing with the application of a moderate degree, should be desisted.

Another and a very successful method of removing a stopper is, to turn the bottle round, when held horizontally over the small flame of a spirit-lamp or candle, applied to the neck. The heat should be applied only to the part round the plug of the stopper, and in a few moments, when that has become warm, the stopper should be tapped with the piece of wood as before. The application of the heat expands the neck of the bottle, and actually rendering it larger, permits the removal of the stopper to be effected by a force previously quite insufficient. As soon as the stopper moves by tapping, it is to be taken out, and must not be replaced until the glass is cold. The application of heat in this manner must be short, and the operation altogether to be successful must be a quick one; for it is obvious that the effect depends upon the *difference* of temperature between the stopper and the neck, and if the former become heated as well as the latter, no good effect can be expected, and the bottle is endangered by the application of heat to no good purpose.

If the contents of the bottle are fluid, it should be held so inclined that they may not become heated; if they are volatile, this method should be tried very carefully, lest the vapour formed within should burst the bottle. The application of heat in this way is seldom successful, unless immediately so; and there is always some risk of cracking the neck of the bottle.

It is often advantageous to put a little olive oil round the edge of the stopper at its insertion, allowing it to soak in for a day or two. If this be done before the heat be applied, it frequently penetrates with increased facility; by oil, heat, and tapping, very obstinate stoppers may be removed. When a stopper has been fixed by a crystallization from solution,

water will sometimes set it free, and it is more advantageous in such cases than oil, because it dissolves the cement. When the cementing matter is a metallic oxide or a subsalt, a little muriatic acid may be useful, if there be no objection to its application arising from the nature of the substance within.

The preceding are all quick operations, and one or other of them will generally loosen a tight stopper, and save the bottle with its stopper and the contents. If they fail, the following method may be tried, which is particularly successful in cases where stoppers are forced inwards by atmospheric pressure, in consequence of internal absorption; the preceding methods often make such cases worse. A piece of strong twine is to be doubled, and a knot tied so as to form a loop of about four inches in length. The knot is to be brought close to the neck of the stopper, the two ends passed round, so as to meet on the opposite side, and tied there tightly, so as to fasten the string securely round the neck. The two strings are then to be tied together, so as to form a loop on that side the stopper equal in length to the first loop, or about four inches. These loops now serve as handles by which to pull at the stopper, and being on opposite sides, permit the force to be applied so as to draw the stopper directly forward out of the neck of the bottle. For this purpose they are to be passed over a fixed bar (if horizontal so much the more convenient), and are to be placed about  $2\frac{1}{2}$  or 3 inches apart on the bar, that by directing the pull on the bottle a little on one side or the other, the strain upon the stopper may be equal or nearly so on the two sides. A cloth is now to be wrapped about the bottle, the hand being applied round the neck, and the bottle is to be pulled steadily. During the endeavour to separate it from the stopper, the latter must be struck gently on each side with the piece of wood, as before directed. The force with which the bottle is pulled must be increased until the stopper either gives way, or the power has been increased unavailingly to such a degree as to excite fear that the bottle



itself may break in the effort. But generally, long before this fear need be entertained, the stopper will leave its place, and the operation will consequently have succeeded. It is necessary to have a care that as the stopper leaves the neck and falls down, suspended only by the string, it shall not swing against any thing so hard as to occasion its fracture; this is easily done by putting a cloth or duster to receive it.

When stoppers become fixed in the necks of jars, they are generally removed with great facility by hitting them from beneath with the end of a stick, which tends directly to force them out of their places; few stoppers will resist this advantageous application of mechanical power. The stick should be a solid and rather heavy one, but not so hard as to endanger the glass. The end of the handle of a hammer answers very well for the purpose, the head of the hammer adding to the momentum and steadiness of the blow.

If the stopper will not give way to any of these methods, then all that can be done is to remove it piecemeal. Large stoppers are often made hollow to diminish their weight; the heads of these may be broken off, when their plugs are easily penetrated by a pointed file, and thus may be separated without loss of the bottle. But if the stoppers are solid, it is only by grinding that they can be removed; this is the work of the glass-cutter, and the value of the bottle is seldom equal to the expense and risk. The bottles of which the stoppers have been successfully broken out, must be refitted with others from the stopper drawer.

All the agents and methods for cleaning glass already referred to, are required occasionally for the cleaning of bottles. The stoppers should be cleaned at the same time, and when acids or alkalies are applied to the bottles, a little should be allowed to flow about the stoppers when in their places, and the latter then worked in the neck for the purpose of rubbing off the impurity, and bringing it more freely into contact with the dissolving or detaching agent. When all foulness is dissolved or washed away, the bottles should be drained, rinsed in distilled water, drained again,

and then wiped; and if necessary dried within, by warming them and blowing air through them. This must be done with more caution than is necessary for flasks, because of the greater irregularity in thickness and form of these vessels. Finally, the stoppers are to be replaced, a little tallow or yellow wax being put round them, in the manner already described.

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*Remarks upon Reagents. By J. J. Virey, M.D.*

To our junior pharmacutists, who are engaged in chemical researches, we would recommend the perusal of the following remarks upon reagents, translated from Virey's *Traité de Pharmacie*, Vol. I. p. 14.

Reagents, properly speaking, are,

1. THE PURE ALKALIES.—Potassa, lithia, soda and ammonia decompose those salts which have earthy and metallic bases. A watery solution of baryta detects sulphuric acid at all times, and forms with it an insoluble salt. Strontia acts in the same manner as the alkalies do.

*Caustic potassa* shows the presence of earths in the milk of sulphur and the mineral acids; of colophony in the resins of guaiacum and jalap; and of alumine in magnesia. It decomposes the protochloride of mercury, and tests the existence of sulphate of magnesia, alumine, and metallic salts in mineral waters.

*Ammonia* forms a blue solution with copper, which may be employed to detect arsenic in tin, in the muriate of baryta, cinnabar, and corrosive sublimate. Copper may always be discovered by this alkali when it is contained in food or drinks, the juice of liquorice, vinegar, and other acids; as well as in alum, the hydrochlorate of ammonia, silver, and the fused nitrate of silver.

It enables us to ascertain the existence of tin in gold leaf; of the oxide of iron in the sulphates of zinc, potassa, soda,

muriate of baryta, acetate of potassa, super-tartrate of potassa, alcohol, and the tartrate of potassa and antimony. By means of *ammonia* we may also recognise alum in wine, alumine in magnesia, the oxides of iron and zinc in sulphate of copper, and the carbonates of lime, the sulphates and hydro-chlorates of magnesia, of alumine, or those with metallic bases, in mineral waters. With magnesia, however, it forms triple salts, which diminishes, in this case, its value as a reagent.

2. EARTHS.—*Lime* and *magnesia* detect carbonic acid. *Lime water* discovers alum in wines, carbonic acid in caustic potassa and alum, sulphate of iron, the alkaline and earthy carbonates, sulphuric, phosphoric, oxalic, and carbonic acids in mineral waters. It forms a yellow brickdust precipitate with the deuto-chloride of mercury or corrosive sublimate.

3. ACIDS.—The *sulphuric* decomposes the neutral salts by displacing their acids or bases; detects the presence of lead in wines and vinegars, in tin, mercury, and the white oxide of zinc; lime in the precipitated white oxide of mercury; the calcareous carbonates and sulphates in magnesia and verdigris\*; and tests the purity of magnesia or lime calcined. In the analysis of waters, this acid shows the existence of the alkaline and earthy carbonates, and of baryta.

The *nitric* disengages the tartaric and phosphoric acids from their bases, decomposes sulphuretted hydrogen gas in mineral waters, precipitating its sulphur; separates the ashes of bones mixed with flour, copper and lead contained in aliments, and copper in gold leaf; discovers the calcareous sulphates and carbonates, and the sulphate of baryta in white lead; proves the presence of silica or plaster in the proto-chloride of mercury, of tin in mercury, the earths or carbonic acid in the caustic alkalies, and of sulphate of lime in magnesia. This acid also tests the purity of tartrate of

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\* Lead in acetic ether.



potassa and soda, and the acetate of potassa, and shows at all times when sulphur and ammonia are present.

The *hydrochloric* decomposes sulphuretted hydrogen gas, detects lead in wines, enables us to distinguish silver from tin in leaves, and discover arsenic in tin. It also recognizes lead in the acetates (more especially in the acetate of potassa of commerce, made by the double decomposition of acetate of lead and sulphate of potassa).

The *nitro-muriatic* or *nitro-hydrochloric* (aqua regia) detects the existence of lead.

The *sulphurous* and *nitrous acids* disengage sulphuretted hydrogen, and precipitate its sulphur.

The *phosphoric* discovers lime, and also separates the oxides of lead from many salts.

The *oxalic* precipitates lime from calcareous salts in wines, supertartrate of potassa, oxide of zinc, mineral waters, &c. The oxalate of ammonia, or the super-oxalate of potassa (salt of sorrel), is very generally employed to effect the double decomposition of the salts of lime.

*Arsenic acid* seizes upon sulphur, and forms a sulphuret in sulphurous waters.

*Chloric* discovers the presence of sulphuretted hydrogen and the hydriodates.

*Iodic* (dissolved in alcohol) detects at all times the existence of starch, and at once changes it to a blue colour.

*Boric acid*. Arsenic, which has been precipitated by lime water from its solution, may be afterwards reduced by being treated with charcoal and boric acid.

*Tartaric* discovers potash united to the sulphuric acid, and to the carbonate of soda.

The *carbonic* precipitates lime pure, &c.

The *acetic* shows the presence of lime in flours, and in the white oxides of lead; separates copper from gold-leaf, white lead from the sulphates of lime or baryta, lead from tin, diaphoretic antimony from the white oxide of zinc, lead and its oxides from those of mercury (such as the white and red precipitates) and cinnabar. Discovers lime in the

white precipitate or protochloride of mercury; tries the purity of minium, verdigris, &c.

*Citric* and *malic acids*, &c. are used in the analysis of vegetables.

4. NEUTRAL SALTS WITH ALKALINE AND EARTHY BASES.—

*Sulphate of lime*, in solution; discovers oxalic acid in the salt of amber and other liquors\*.

The *alkaline sulphates* form white precipitates with the solutions of lead.

*Nitrate of potassa* reveals manganese, iron, and arsenic in sulphur, and decomposes crude antimony by the aid of heat.

*Nitrate of baryta* separates the sulphuric acid from sulphuric ether.

*Dry muriate* or *hydrochlorate* of *ammonia* detects potassa or lime in sugar, by giving it an ammoniacal odour.

*Muriate of baryta* shows the presence of sulphuric acid in vinegars; or the hydrochloric, nitric, phosphoric, and tartaric acids in sulphuric ether and Hoffman's liquor; the sulphates in the muriates of soda or ammonia, in the nitrates, in the sub-borate of soda, in mineral waters, sugar of milk, and the succinated liquor of hartshorn.

*Muriate of lime* recognizes phosphoric and oxalic acids every where; phosphate and sulphate of soda and carbonate of soda in waters; carbonic acid in caustic ammonia.

*Acetate of baryta* discovers alum in wine, and sulphuric acid in vinegars, salts, and every other substance that contains it.

*Carbonate of potassa* enables us to recognize alum in aliments and drinks, lime in beer, and tartaric acid in vinegar, and in the salt of amber or succinic acid: to test lime-water, and precipitate the metallic oxides from the sulphates; earths from the muriates; iron, copper, and earths from all the salts with alkaline bases: to separate the acids from

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\* We would suggest that the sulphate is very slightly soluble in water, and not likely to be employed in this way as a test.—ED.

ethers and Hoffman's liquor, as well as water from alcohol, by which its strength is increased. Finally, it discovers muriate of ammonia in succinic acid.

*Carbonate of soda* decomposes the earthy and metallic salts in mineral waters.

*Hydrocyanate* or *prussiate of potassa* or *lime* precipitates iron of a blue colour from its solutions. The prussiate of potassa detects copper in aliments, iron in oxide of zinc (fleurs), mineral waters, caustic potassa, and acids.

*Sub-borate of soda* or *borax* proves the presence of cobalt in colours, by employing it as a reducing flux.

5. SALTS WITH METALLIC BASES.—*Sulphate of silver*, in solution, indicates the muriates in the salts, in lemon-juice, in waters, and discovers arsenic in sulphur.

*Sulphates of iron* and of *copper* act on gaseous sulphuretted hydrogen.

Recent sulphate of iron (green, protosulphate, or at the *minimum* of oxidation) gives a rust (oxide of iron at the *maximum*) by oxygenated waters, and at all times forms a black precipitate with tannin and gallic acid. Sulphate of copper discovers arsenic and corrosive sublimate in aliments, and sulphur in sulphurous waters.

*Nitrate of silver* precipitates animal mucus, exposes the presence of sulphur and sulphuric acid in wines; detects the hydrochloric acid in vinegars, nitric acid, the alkalies (after their saturation), nitrate and acetate of potassa, the magnesian salts, carbonate of soda, tartrate of potassa or soda, and sugar of milk; it recognizes phosphorus by a black precipitate of phosphuret of silver, and shows the existence of the muriates and sulphates in distilled waters; and is itself blackened by the hydrosulphurets.

*Nitrate of mercury* precipitates also mucilages and other vegetable principles, discovers alum in water; tests lime-water, reveals the sulphates, muriates, and hydrosulphurets in waters, as well as the carbonates of soda, lime and magnesia, and always the sulphuric and hydrochloric acids.

*Nitrate of lead* betrays the presence of sulphuric acid in



combination with tartaric acid, salt of amber, tartrate of potassa and soda, supertartrate of potassa, and tartar emetic; and uniformly forms a precipitate with the hydrochloric acid.

*Hydrochlorate* or *chloride of arsenic* or of *antimony* and *platina*, demonstrates the existence of sulphur in mineral waters. By mixing the *chloride of platina* with salts having potassa or soda for the base, a change of colour results; with those of potassa a yellow precipitate takes place, while with those of soda the liquor only is tinged yellow; and a reddish yellow precipitate follows the addition of ammonia or its salts.

*Deutochloride of mercury* (corrosive sublimate) precipitates animal albumen; recognizes, in waters, the carbonates of soda and lime, and is precipitated by the hydrosulphurets, like all the metallic salts.

*Acetate* and *liquid superacetate of lead* (extract of lead) precipitate animal mucus, and reveal sulphuric acid in vinegar and other liquors, in nitric and tartaric acids, and neutral salts; discover alum in tartar, and the sulphate in tartrate of soda; the alkalies, earths, sulphates and muriates in waters, as well as sulphuretted hydrogen, and especially sulphur.

6. THE PURE METALS (OR REGULI).—*Silver* discovers sulphuretted hydrogen (hydrosulphuric acid) in wines impregnated with sulphur, and in albumen, by blackening them.

*Mercury, liquid or flowing*, detects the same substances as the former in mineral waters, and corrosive sublimate in aliments.

*Polished copper* also shows the presence of corrosive sublimate.

*Polished iron* precipitates copper found in wines and aliments, and enables us to ascertain the presence of the same substance in iron filings, extract of lead, lunar caustic, neutral salts, tartar, tartrate of potassa, the sulphates of iron and zinc, and the muriate of baryta; also in tamarinds, liquorice-juice, extracts, &c.

Polished zinc discloses lead in vinegar, tin in tartar emetic, and sulphur in arsenic.

7. THE METALLIC OXIDES seize upon all the hydrosulphurets, or decompose them, and unite with the sulphur. The oxide of copper, dissolved in ammonia (ammoniuret of copper), manifests the existence of arsenic in tin and corrosive sublimate, and the oxide of antimony in aliments.

8. THE SULPHURETS, CARBURETS, SOAPS, &c.—The *hydro-sulphate of ammonia* detects the metals:—lead in vinegar, mineral waters, and muriate of baryta; arsenic in food; precipitating them of a black colour. The *hydrosulphates*, the *probatory liquor of Hahnemann*\* detect lead in wine, vinegar, beer, aliments, colours, acetic ether, and in acetate of potash, prepared from the decomposition of acetate of lead; also antimony in wine, copper in alcohol, and mercury in the muriate of soda; tartrate of potassa in diaphoretic antimony and the white precipitate of mercury; discover arsenic in the muriate of baryta, cinnabar and corrosive sublimate, as well as red lead in vermilion. They also show the quantity of antimony contained in tartar emetic.

All the hydro-sulphates precipitate or reveal most of the white metals, as lead, mercury, bismuth, silver, &c. The *black flux* reduces the oxides of lead, or antimony when found in aliments, and tests the purity of red and white lead and other oxides.

*Alcoholic solution of soap* may be used to ascertain the presence of free acids, carbonic acid, salts of metallic or earthy bases in waters. It also announces the existence of sulphate of lime in *hard* (*crues*) waters, as well as salts with metallic bases.

9. ALCOHOLS AND ETHERS.—*Alcohol* precipitates from

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\* This is prepared with the sulphuret of lime, and tartaric acid, of each ℥iv.; distilled water, lb. ij.—mix in a covered vessel. Decant the liquor from the deposit, and add tartaric acid, ℥j. See Pharmacop. Batav. 1805, in 4to.

Another hydrosulphate is that of arsenic made with orpiment, ℥ij.; pure or quick lime, ℥iss.—Boil in distilled water, ℥xij. Filter. It precipitates lead of a black colour.

their aqueous solutions the neutral salts which it cannot dissolve, and accelerates their crystallization. It separates tartaric acid from vinegar, phosphate and sulphate of lime from phosphoric acid, sulphate of potassa from sulphuric, tartar from succinic, the sulphates from waters, resins from assa-fœtida, black pitch from asphaltum, essence of turpentine from oil of petroleum, the volatile from the fixed oils (except ol. ricini which it dissolves), colophony from resin of tacamac; tests caustic and carbonated ammonia, salts, and spirit of amber, &c.

*Sulphuric ether.* The nitric, muriatic, and acetic ethers readily undergo decomposition, and their acids separate; they are not therefore as perfect as the sulphuric or phosphoric of M. Boullay. Sulphuric ether separates the fixed oils from balsam of copaiba (nevertheless these oils are only partially soluble in this fluid), spermaceti, the grease of fixed oils, or the butter of cocoa from wax; but alcohol is a preferable reagent in these cases.

10. WATERS AND AQUEOUS SOLUTIONS.—*Distilled water* answers the purpose of washing substances; it separates the oxide of bismuth from nitric acid, wine or tin; discovers alcohol in the volatile oils and ethers; tests the protochloride or butter of antimony, the acetate of lead; and precipitates bismuth from the white oxide of mercury, tin, &c.

*Tincture of nut galls*, aqueous or alcoholic, detects iron in sulphuric acid and alum; or the ammoniacal salts, muriate of baryta, acetate of potassa, sulphates of potassa, soda, or zinc, in the white oxide of zinc, hydrochloric acid, mineral waters, &c. and the precipitate is at all times either black or violet. It also precipitates all the substances in which azote predominates.

*Tincture of tan* precipitates albumen and gelatine, iron and the metallic oxides; enables us to test tartar emetic, cinchona and other vegetable decoctions.

*Gelatine* in solution discovers the presence of tannin and precipitates it.



*Translation of the Preface to the Codex Medicamentarius.*

In publishing the following translation of the preface to the French Pharmacopœia, we are influenced by the wish to make more generally known in this country the truly wise principles upon which that work was planned, and the zeal, industry, and scrupulous accuracy of research by which it was brought to a successful completion. The profession of pharmacy has reason to be proud both of the confidence in its members which an invitation to share in the work implied, and of the subsequent proofs of diligence and skill by which this confidence was justified. As we are prone to imitate what we admire, perhaps the example which is here afforded may lead to a still happier result than the mere excitation of a transient interest.—*Ed.*

## PREFACE.

A long time had elapsed since any copies of the ancient *Codex* were to be found in the shops, the progress of chemistry had changed and remodelled the nomenclature of that science, the discovery of powerful and efficient medicines had augmented the resources of the healing art; by every consideration, therefore, the publication of a new Dispensatory was rendered indispensable: but it was necessary that it should be presented to the public, loaded, on the one hand, with a much smaller number of compounded medicines, richer, on the other, in simple preparations executed according to processes more correctly and precisely described.

In compliance with the repeated orders of the minister of the interior, the Faculty of Medicine of Paris, with the design of executing this work, chose from among its own professors, *MM. Le Roux* its dean, *Vauquelin*, *Deyeux*, *De Jussieu*, *Richard*, *Percy*, and *Hallé*; and requested at the same time the concurrence of the School of Pharmacy, which appointed three of its professors, *MM. Henry*, *Vallée* and *Bouillon-Lagrange*. The members of this commission had

met together, and devoted themselves to the undertaking, when they had the misfortune to lose one of their fellow-labourers, *M. Vallée*, whose place however the School of Pharmacy supplied by *M. Cheradame*, its treasurer and oldest member.

Each individual contributed to the execution of the work, not only by giving his opinion at the meeting of the commissioners, but also by private labours and experiments.

*M. Deyeux* had already prepared a first sketch of the new formulary; and the different sections and chapters of his essay were the first subjects submitted to the examination of the commissioners, at their meetings, which took place twice a week.

*MM. Henry, Vauquelin, Vallée*, and several others, afterwards made a great number of experiments, with the object, in some instances, of more thoroughly investigating the nature of the principal medicinal substances; in others, of establishing the best mode of combining them, and of executing the most essential prescriptions. All the experiments to which we have referred, without naming the author, were performed by *M. Henry*.

*MM. De Jussieu, Richard, Vauquelin* and *Henry* undertook the catalogue of the materia medica.

Many others among the physicians and pharmacutists of Paris also contributed to the success of the work. We ought to mention among others, *MM. Boudet, Guilbert, Duchâtelle*, and *Barruel*. We drew much from the collection known at first under the title of *Bulletin de Pharmacie*, afterwards designated by that of *Journal de Pharmacie et des Sciences Accessoires*. Of all the works which it was in our power to consult with advantage, certainly no one is to be preferred to this valuable compilation. We are indebted to professor *Chaussier* for important facts derived as well from his conversation as from his writings; nor do we know to what fatality it is owing that he was not directly associated in our labours. We moreover received many useful hints from the writings of *Baumé*, of *Parmentier*, of *MM. Planche*,



*Boulay, Robiquet, Cadet, Pelletier, Virey, Swediaur*, and of several others. Hints were in like manner derived from the latest foreign Pharmacopœias: such as those of Sweden, Berlin, Holland, St Petersburg, London, Edinburgh, &c., and especially from *M. Niemann's* additions to the Batavian Pharmacopœia, forming in themselves a kind of universal Pharmacopœia, which, though certainly not exempt from error, is nevertheless highly useful; not only from the abundance of its matter, but also in consequence of the analyses of medicines which it contains, and the judicious and important remarks of its learned author.

The final arrangement of the work, and its translation into the Latin language were confided to professor *Hallé*, who sought the aid of *MM. De Jussieu, Richard*, and several others.

When the work, accomplished as well by the individual as by the common labours of the commissioners, had been read over again, examined, and corrected in the general meetings, and was thus completely finished, it was directed to be sent to the press by the minister of the interior, who decided, with the approbation of his majesty, that it should receive the title of "*Codex Medicamentarius, sive Pharmacopœia Gallica.*" The printing of this edition was trusted to *M. Hacquart*. As the proofs came out of his hands, they were anew submitted to the examination of the commission; and it was only after its members were satisfied of their entire correctness, that they were finally delivered to the press.

As the essential object of the new *Codex* is to present to the apothecaries a uniform method for the preparation of medicines, by means of which they may be found every where and at all times absolutely the same, it was necessary, in the arrangement of the work, to adopt a method borrowed from the nature of the pharmaceutic operations themselves. On this principle we have divided the book into ten sections, of which the following are the titles.



I. Preliminary preparation of simple drugs, and pharmaceutical precautions.

II. Medicines derived from simple substances with the least possible alteration of their elements.

III. Medicines obtained from simple substances submitted to fermentation.

IV. Medicines obtained by the distillation of simple substances.

V. Solution of medicines in different liquids.

VI. Matters extracted from the different solutions inspissated.

VII. Medicines obtained from bodies by means of chemical analysis.

VIII. Medicines prepared by synthesis; i. e. formed of elements combined by chemical operations.

IX. Medicines formed solely by the mixture of simple substances, and designed particularly for internal use.

X. Medicines which, from their composition or their form, are designed especially for external use.

Under these titles we have arranged the various formulæ for the preparation of medicines. The formulary is preceded by a catalogue of the *materia medica*, in which the substances are disposed according to their origin from the mineral, vegetable, or animal kingdom.

In this catalogue, independently of the botanical, zoological, and mineralogical characters, which we have only briefly indicated, we have, as far as we were able, added those which may serve as tests of the quality of the different substances, whenever it is possible to be mistaken, or to be deceived in this respect.

When occupied with this part of our work, we hesitated whether to confine ourselves to the medicines which are at present adopted, and in daily use, or to introduce also into the collection a certain number of substances which, though formerly employed, are now forgotten or despised. Having examined the subject with attention, we came to the conclusion, that it would not be without advantage to those

among us who make a particular study of the ancient writings, or feel an interest in the practices of foreign and distant nations, to find in our catalogue such a list and compared nomenclature as might enable them to understand what is doing, or has been done, in times and places so different from ours. Besides, have we not numerous examples of medicines, which, having fallen into contempt and total disuse, from their supposed inefficiency or from apprehension of their injurious operation, have, in our days, been again brought forward and received into favour? Nor is it less advantageous to know the names of most of those vegetables, which, in case of necessity, may supply the place of such as are in common use. It has also been thought proper to give a place to certain substances, whose products are concerned solely in domestic economy, or in the operations of chemistry. We have in general preferred superabundance to deficiency.

In constructing the formulæ, we thought that our first care should be to leave nothing uncertain or equivocal, either in the mode of preparing the simple substances which nature presents to us, or in the production of those which result from pharmaceutic operations, or, finally, in the method of forming those compositions in which many substances are united, the mixture of which demands a precise order, and special precautions.

Among these different preparations, there are some which should always be kept ready made in the shops; they are called *officinal*. There are others which should be formed extemporaneously, according to the direction of the physician; these are denominated *magistral*. As to the latter, though the physician most commonly arranges their constituents according to the indications which each is calculated to answer, the apothecary, in executing the prescription, should not usually confine himself to this order; he should mix the substances conformably to the known laws of the chemical actions by which their union is to be effected. It is in accordance with this view that we have introduced



some examples of the *magistral formulæ*, not for the instruction of the physician, but in order to present to the apothecary illustrations of the care which he should exercise, and the method which he should pursue, when called upon to execute analogous prescriptions. Almost all the watery solutions are of this character; and under this title, therefore, we have sought to unite most of the varieties which they can afford, either in the order of their mixture, or the mode of preparing them.

Of the *officinal* preparations, some are simple, others composed of several medicines. In the sections to which they belong, we have generally arranged them in separate articles. Among the compounded preparations we have preserved only such as are every day demanded of the apothecaries by the public, and frequently by the physicians themselves. For though, at the first glance, it might appear to us that many of these prescriptions ought to be omitted, and their place in the Dispensatory supplied by more simple formulæ, we thought, nevertheless, that it did not become us thus to pronounce a kind of interdict against those which are still in daily use, and are even frequently prescribed by the masters of the art.

We have, therefore, retained some of them, but have restricted ourselves to a small number. Nor did we think that we ought lightly and arbitrarily to alter the formulæ, except in such points as concerned the perfection of the pharmaceutic processes. In fact, it seemed to us by no means proper to furnish any individual with a remedy entirely different from that which he might expect to receive. We know that the authors of the foreign Pharmacopœias do not agree with us on this point: but we thought it our duty to retain, without alteration, the modes of forming those remedies which are most employed by the physicians, and most extensively used by the public.

Nevertheless, while we thus yielded to usage, we felt desirous to simplify these formulæ, and have, therefore, been careful, however compound they might be, to cause those



substances to be distinguished in their composition to which they owe their chief virtue. This we have accomplished, either by pointing out the substances in the title itself, or by marking them in the formulæ with a particular character, or by means of a special note placed at the end of the prescription. Besides, we have in every instance designated the proportion which they bear to the whole mass of the medicine, so that any one may at pleasure reduce these formulæ to the simplest terms, without changing their real properties. Thus in offering the confused mixtures of drugs which constitute the most celebrated electuaries, such as the *dioscorium* and the *theriac*, the care which we have taken to arrange in classes the crowd of substances which enter into their composition, and to calculate the whole amount of these substances in each class respectively, gives rise to a kind of medical analysis of the preparations. Besides, we have annexed to the *theriac*, the most ancient of all, a chemical analysis of this singular composition, made with much care by M. *Guilbert*. And, in fact, when we have under consideration those remedies which have been employed with advantage by the celebrated men who have preceded us, and which are still usefully employed in our own times, is it not better to endeavour to appreciate their true value, than to reject them with contempt?

Independently of those preparations which have been so long registered in our formularies, and have not yet disappeared from practice, we have borrowed a very few others from the foreign pharmacopœias. We also thought that it was proper to make known to the public certain secret remedies generally used, and habitually exposed for sale in the shops, whenever we could obtain direct and satisfactory assurance of their composition, or ascertain it by means of analysis. This is the only mode of removing the danger which is always attached to the inconsiderate use of every remedy, the nature and value of which are equally uncertain.

Were not necessity, usage, habit, endued with the force

of law, the best plan would certainly be to erase from our collections the greater number of compounded remedies; for it would accord much better with the interest of the art, and with that of the sick, to combine the ingredients in such manner as the circumstances of each particular case might require, and in such proportions as might be determined by the occasion, as well as by the constitution and particular situation of those to whose convenience the remedies should be especially adapted.

We thought that our most essential object should be to secure the purity and perfection of the simple medicines, particularly of those which are the products of pharmaceutic operations; and to determine with accuracy the proportion of the elements which concur in their formation. It is to this end, therefore, above all, that our efforts have been directed. It is indeed by this alone that the virtue and efficacy of these medicines are insured; and it is on this that the quality of the compositions into which they enter must depend. The progress of chemistry has rendered such accuracy obligatory upon us, and we have, therefore, in the detail of the operations, feared much less the accusation of prolixity, than that of negligence. We ourselves made, with this design, numerous experiments, for the success of which we are indebted to the care and skill of *M. Henry*.

In consequence of recent discoveries, we have been enabled to bring into notice substances which had long been neglected, and to distinguish others which, though very different, had been confounded together, and to offer them anew to the investigation of the medical profession. We have extended this care principally to the extracts of opium, prepared by different methods, and to certain varieties of oxides and metallic salts, especially to those of iron, mercury, antimony, and zinc, so important from their use in medicine, and so different in their effects, according to the different states in which they are employed. To their vulgar denominations we have added, in the titles under which they are placed, those which characterise their true nature; and



in all instances in which there is no longer uncertainty in this respect, we have annexed the names adopted in the new nomenclature.

What we now offer to the physicians are the instruments of their art; but let it not be thought that in these is to be found the art itself. They would be strangely mistaken in the object of medicine, who should believe that its chief end is the search of new remedies, or the invention of new formulæ; and who should think that true progress can be made in the art only by submitting all the substances in nature to the test of experiment. Undoubtedly we are acquainted with men—though their number is very small—indefatigable in their investigations of nature, enterprising with prudence, more attached to truth than greedy of renown; who in the difficult and perilous career of experiment, incapable of disguising their errors, know how to weigh scrupulously in a just balance, the fortunate and unfortunate results of their experiments; and who, by this wise plan, have succeeded in adding true riches to our materia medica, and have learned to call successfully to the succour of life even the poisons which seemed to have been produced for its destruction. But on the other hand, has not our age too often been witness of the delirium which seems to possess the minds of some practitioners, who think themselves idle by the sick bed when they have not agitated the frame by the violent shock of those medicines which they call energetic; who are deaf to the voice and the directions of nature; boasting of their guilty trials of a hazardous medicine as of something wonderful; straying far from the track of *Hippocrates*, *Aretæus*, *Celsus*, *Fernel*, *Boillou*, *Sydenham*, *Stahl*, *Torti*, *Baglivi*, *Boerhaave*, *Hoffman*, *Huxham*, *Pringle*, *Swieten*, *Stoll*, *Bordeu*, *Lorry*, *Barthez*, and others who have attained to greatness by their talents and knowledge.

For our own part, let us remember that the science which we cultivate is founded much less on the multitude of medicines, than upon a method springing from the study and observation of nature; let us not forget that the new paths



which experience may open to us will be sure and practicable only so long as we strive to understand perfectly, and to take for our guides, the laws of the animal organization, of which the characteristic phenomena are always kept in sight by the wise man; and that the presumptuous vanity of inexperienced youth, or the most shameful ignorance could alone venture to infringe, or affect to despise them.

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*Evaporation by means of Bladders.*

M. Sæmmering, in a memoir in the Academy of Sciences of Munich, states that alcohol, in a vessel covered with a bladder, the latter not being in contact with the fluid, loses, when exposed to a dry atmosphere, much of its water, and becomes stronger. But if the vessel thus closed be exposed to a damp air, the alcohol attracts humidity and becomes weaker.

In a second memoir, the author states more particularly the effect of bringing the alcohol into immediate contact with the membrane. If a bladder be filled with 16 ounces of alcohol at 75°, and be well closed and suspended over a sand bath, or placed near a warm stove, so as to remain at the distance of more than an inch from the hot surface, it becomes, in a few days, reduced to a fourth of its volume, and is nearly, or quite, anhydrous.

M. Sæmmering prepares for this purpose, calves' or beeves' bladders, by steeping them first in water, washing, inflating, and cleansing them from grease and other extraneous matters, tying the ureters carefully, and then returning them to the water in order to clear off more fully the interior mucosity. After having inflated and dried the bladders, M. S. covers them with a solution of ichthyocolla, one coating internally and two externally. The bladders thus become firmer, and the alcoholic concentration succeeds better.

It is better not to fill the bladder entirely, but to leave a small space empty. The bladder is not moist to the touch, and gives out no odour of alcohol. If the latter be below 16° Baumé the bladder then softens a little, and appears moist to the touch.

Bladders prepared as above may be employed more than a hundred times, though they at length acquire a yellowish-brown colour, and become a little wrinkled and leathery. The swimming bladder of the salmon is not fit for these experiments. Alcohol of 72° was put into one of them, and after an exposure of thirty-two hours, it had lost more than one-third of its volume, and was weakened 12°. The alcoholic vapour was perceived by the smell.

Into two bladders of equal size were put, into one, eight ounces of water, and into the other, eight ounces of alcohol. They were placed side by side, exposed to a slight heat. In four days the water had entirely disappeared, while the alcohol had scarcely lost an ounce of its weight. Mineral water, and that of wells, evaporate and deposit on the interior of bladders, the saline matters which they contain.

If the heat be conveniently managed, absolute alcohol may be obtained in six to twelve hours. Solar heat is even sufficient to produce anhydrous alcohol.

Wine placed in prepared bladders contracts no bad odour; it assumes a deeper colour, acquires more aroma, and a milder taste, and becomes, generally, stronger. Spirits of turpentine of 75°, contained in a cylindrical glass closed with a bladder, lost nothing in four years. Concentrated vinegar lost the half of its volume in four months, the other half acquired more consistency, and had no longer an acid taste. The water of orange flowers was about one-third evaporated in a few months, appeared to have a stronger odour, and, consequently, had lost nothing of its volatile principle.—*Ferussac's Bulletin, Mai 1828.*

*Wollaston's method of rendering Platina malleable.*

A paper was read on a method of rendering platina malleable, by Wm Hyde Wollaston, M.D. F.R.S. &c. In this paper the author details the processes which, from long experience in the treatment of platina, he regards the most effectual in rendering that metal perfectly malleable. When it is purified by solution in aqua regia, and precipitation with sal ammoniac, sufficient care is seldom taken to avoid dissolving the iridium contained in the ore by due dilution of the solvent. The writer states the degree of dilution requisite for this purpose, and exact proportions in which the acids are to be used. The digestion should be continued for three or four days, with a heat which ought gradually to be raised; and the fine pulverulent ore of iridium allowed to subside completely before the sal ammoniac is added. The yellow precipitate thus obtained, after being well washed and pressed, must be heated with the utmost caution, so as to expel the sal ammoniac, but at the same time produce as little cohesion as possible among the particles of platina. It is then to be reduced to powder, first by rubbing between the hands, and next by grinding the coarser parts in a wooden mortar with a wooden pestle, because the friction with any harder surface would, by producing burnished surfaces, render them incapable of being welded together by heat. The whole is then to be well washed in clean water. In this process the mechanical diffusion through water is made to answer the same purposes as liquefaction by heat in the case of other metals; the earthy impurities being carried to the surface by their superior lightness, and the effect of fluxes being accomplished by the solvent powers of water.

The gray precipitate of platina, being thus obtained in the form of uniform mud or pulp, is now ready for casting, which is effected by compression in a mould, formed of a brass barrel, six inches and a half long, and turned rather



taper within, so as to facilitate the extraction of the ingot when formed. The platina is first subjected to partial compression by the hand with a wooden plug, so as to expel the greater part of the water. It is then placed horizontally in an iron press, constructed so as to give great mechanical advantage to the power applied to produce compression. The cake of platina is then to be heated to redness by a charcoal fire, in order to drive off all the remaining moisture; afterwards subjected to the most intense heat of a wind furnace; and lastly, struck, with certain precautions, while hot, with a heavy hammer, so as effectually to close the metal. The ingot thus obtained may, like that of any other metal, be reduced, by the process of heating and forging, to any form that may be required. It may then be flattened into leaf, drawn into wire, or submitted to any of the processes of which the most ductile metals are capable.

The perfection of the above method of giving complete malleability to platina is proved by comparing the specific gravity of a fine wire of that metal obtained by this process, which is found to be 21.5, with that of a similar wire drawn from a button which had been completely fused by the late Dr Clarke with an oxy-hydrogen blowpipe, and which the author ascertained was only 21.16. A further proof of the excellence of the method employed by the author is derived from the great tenacity of the platina thus obtained, as determined by a comparison of the weight required to break wires made of this metal so prepared, and similar wire of gold and of iron.

These weights he found to be in proportion of the numbers 590, 500, and 600, respectively.—*Annals of Philosophy.*

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*Comparative activity of tartarized antimony, as prepared by different formulæ.*—M. Henry, Sen. has ascertained experimentally the several quantities of sulphuret of antimony precipitated by sulphuretted hydrogen, from a given weight of various specimens of unpurified tartar emetic,

and compared these amounts with the quantity precipitated from a very pure tartar emetic, as a standard.

Two parts of the standard preparation gave  
of sulphuret of antimony - - - - 1.04 parts

While the same quantity of tartar emetic,  
according to the London Pharmacopœia, gave 0.98

Dublin do 1.00

Edinburgh do 0.99

Paris Codex (with glass of  
antimony) - - - 0.68

Mr Philips's Formula, - 0.74

All these preparations, however, when well purified, contain the same quantity of protoxide of antimony.—*North American Medical and Surgical Journal*, from the *Journal de Pharmacie*, July 1825.

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*Henry's magnesia*.—M. Robiquet has remarked that this magnesia, though soft to the touch, and in very fine powder though compact, is less soluble in acids than the ordinary French calcined magnesia. This difference depends upon the strong calcination to which the former is subjected, whereby it is probably rendered less soluble in the juices of the stomach.—*North American Medical and Surgical Journal*, from the *Revue Médicale*, January 1827.

With respect to the calcination of magnesia, we believe some of the apothecaries of Philadelphia are in the practice of sending the article to the potters, to be exposed to the strong heat of their kilns. This may save trouble, but as the vessels in these ovens are placed in tiers, and each one is covered by the bottom of that which is above it, we doubt whether as much of the carbonic acid can escape as is desirable in this process. In Mr Durand's paper it is stated that *perfectly pure magnesia only* will cause the solidification of copaiba, and we know by experiment that all the magnesia usta of the shops will not accomplish this object. The inference is, that the magnesia was not originally deprived of all



its carbonic acid gas, or that it had re-absorbed it from the atmosphere; the latter event we have always been taught to believe took place very slowly.—*Ed.*

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*Acetate of mercury.*—Mr Garret states that there is a proto and per acetate of this metal, and attributes the occasional violent action of Keyser's pills to the presence of the latter salt. On the authority of M. Robiquet it is stated that a partner of Keyser was in the habit of preparing the acetate by dissolving red precipitate per se in acetic acid. The plan of the late M. Vallee, former professor of the school of pharmacy, was by double decomposition between the protonitrate of mercury and acetate of lime.—*N. Am. Med. and Surg. Journ. from the Archiv. Gen. de Med. July 1826.*

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*Cornus circinata.*—Dr Robinson, in an essay on the properties of this bark, gives the following facts, derived from George W. Carpenter, respecting its composition and chemical habitudes. Diluted alcohol is the most appropriate menstruum to separate its active properties; the extract is dark red, and possesses all the astringency and bitterness of the bark in a concentrated degree. The alcoholic solution is rendered milky and precipitated by water; the extract from the ethereal tincture is a compound of resin, oil, and a peculiar saline matter, which compound appears to combine the most active portions of the article. Sulphate of iron changed its colour, and afforded a light precipitate; lime water occasioned a copious deposit; sulphuric, nitric, tartaric, acetic, and prussic acids did not alter the infusion. The most marked difference between the effects of reagents on the circinata and cinchona, is, that with the infusion of the former, neither galls or gelatine throw down any precipitate, while with the latter a deposit always follows. The constituents of this bark appear to be tannin, gallic acid, resin, gum, mucilage, oil, and a peculiar saline matter, which is less bitter and more astringent than the salt discovered in the cornus florida.—*North American Medical and Surgical Journal, July 1828.*



*Action between nitrate of silver and linseed.*—Apothecaries in France are in the habit of keeping the fused nitrate of silver in linseed. It is stated by M. Dulong that a mutual action takes place between these substances, and that although when dry this is slow, yet an appreciable quantity of the fused nitrate is absorbed by the seeds, leaving minute excavations on the surface of the nitrate. Other seeds have the same effect, and M. Robiquet stated that death had followed the use of linseed in which this caustic had been preserved. We do not know that this practice prevails any where in this country, but the fact is worthy of note. M. Dulong states that it is very important to avoid the use, in pharmaceutical operations, of vessels fabricated of more than one metal. *Communicated to the section of pharmacy of the French Academy, by M. Henry.*—*N. Am. Med. and Surg. Journal.*

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*Mode of distinguishing arrow-root from wheat or potato starch.*—M. Virey states that ten grains of wheat or potatoe starch will form a pretty thick jelly with two ounces of boiling water, while the same quantity of arrow-root forms a thin liquid. The mode of distinguishing one substance from another is always valuable knowledge, and as a considerable quantity of potato starch has lately been introduced to our market, and at first palmed upon our apothecaries for Bermuda arrow-root, the above test may not be unworthy of remembrance.

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*Residuum of nitre, after exposure to a red heat.*—In the beginning of May 1827, Mr, now Dr, Robert Bridges, observed when water was poured into an iron flask used for obtaining oxygen from nitre, that a lively effervescence occurred, and the gas evolved, proved, on examination with Dr Hare's eudiometer, to be oxygen of the purity of ninety-five per cent. Subsequently he obtained this element by the same means, containing only one per cent. of impurity. The same observation was made by R. Philips, of London, in 1827. The rationale offered by Dr Hare of this discovery

is, that the residuum of the nitre in the flask was a peroxide of potassium, which, by the affusion of water, gave off its second dose of oxygen, and became converted into hydrate of potassa. Mr Philips offers the same solution of the fact.

Dr Bridges suggested that peroxide of potassium obtained in this manner from nitre, would form a good preparation from which to obtain pure oxygen, without the least trouble to the experimenter.—*N. Am. Med. and Surg. Journal*.

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*Preparation of per-iodide of mercury.*—Add a solution of hydriodate of potassa to a solution of per-nitrate of mercury. By double decomposition there will be formed nitrate of potassa, water, and a red precipitate, which is the iodide in question. It is applied in alcoholic or ethereal solution, mixed with lard, or suspended in oil.—*N. Am. Med. and Surg. Journal, from the Nouvelle Bibliothèque Médicale, December 1826.*

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*Pure strychnia not reddened by nitric acid.*—In the Journal Général de Medecine, for August 1828, M. Caven-tou has inserted a note in correction of a mistake, contained in the memoir of MM. Orfila and Le Sueur, on the detection of poisons in bodies a long time after death. The latter gentlemen stated in their memoir that they verified the presence of acetate of strychnia by a red colour developed by nitric acid.

This alkali was discovered in 1818 by MM. Pelletier and Caven-tou. They stated that it was reddened by nitric acid; at the same time they found that strychnia procured from nux vomica presented this character in greater degree than when extracted from the bean of St Ignatius. They suspected the cause of this difference to depend on a greater or lesser quantity of brucia being present; and subsequently verified this suspicion by chemical researches on the *upas anthiar* and *tieuté*, the celebrated poisons of Java. The result is that pure strychnia is not reddened by nitric acid, and that this colour only follows the addition of the



acid when brucia is combined; which is the case in the nux vomica and the bean, or a yellow colouring matter found only in the upas tieuté.—*N. Am. Med. and Surg. Journ.* Jan. 1829.

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*Fermentation of opium as applied to the extraction of morphia.*—On the 26th of July last, M. Blondeau read a note to the section of pharmacy of the French Academy of Medicine, on the application of fermentation to the separation of morphia from opium. It results from his experiments that when fermentation has decomposed the other elements of the drug, nearly the whole of the morphia may be obtained. By pursuing this plan Mr B. has procured from the French pound of opium as many as fourteen “gros,” equal to 827.4 grs. troy. This is a very extraordinary product, and we hope some of our pharmacutists will be disposed to attempt the repetition of the process.—*N. Am. Med. and Surg. Journal.*

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*Artificial production of diamonds by M. Gannal.*—Introduce several sticks of phosphorus into a small matrass containing the bisulphuret of carbon, covered with a layer of water. The phosphorus will melt and sink to the bottom of the matrass. Mix the ingredients together, and by their reaction, phosphuret of sulphur will be formed, and a white powder generated, which reflects the prismatic colours, and which appears to consist of a multitude of minute crystals. Upon repeating the experiments and giving more time for the crystals to form, a few were obtained of the size of a millet seed. These were submitted to M. Champigny a jeweller, who examined them carefully, and satisfied himself, 1st, that they scratched steel; 2d, that they were of a pure water; and 3d, that they caused a most brilliant reflection of light. In a word he pronounces them to be true diamond sparks.—*Journal de Chimie Med.*

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*Coniin or the active principle of cicuta.*—M. Brande



gives the following process for obtaining this principle:—Digest the leaves and stem of the fresh plant, well bruised, for several days, in alcohol. Filter the solution and evaporate to dryness. Treat the alcoholic extract with water, and add to the aqueous solution obtained either magnesia, alumina, or the oxide of lead. Evaporate this solution to dryness, and treat the dry residue with a mixture of alcohol and ether. This menstruum takes up the coniin, which, by a new evaporation to dryness, is left in a pure state.

This principle, according to M. Gieske, possesses the following properties. 1st, In contact with tincture of iodine its solution gives rise to a reddish precipitate. 2d, The tincture of galls renders its solution brown, but causes no precipitate. 3d, It precipitates solutions of sulphate of mercury and muriate of zinc of a dirty yellow colour. 4th, It occasions a slight turbidness in solutions of the carbonates of potassa and soda. 5th, It communicates a brown colour to the muriate of platinum. 6th, With the nitrates of silver and baryta, the acetates of baryta and lead, the muriate of lime or lime water, it gives rise to grayish white precipitates.

Half a grain of coniin is sufficient to kill a rabbit.

The symptoms induced by it are analogous to those produced by strychnia.—*N. Am. Med. and Surg. Journ. from Archiv. General. June 1828.*

A. T. Thomson in his Dispensatory, 4th edition, says, "The virtues of conium are extracted by alcohol and sulphuric ether. To the ether it communicates a very deep green colour; and when the tincture is evaporated on the surface of water, a rich dark green resin remains, in which the narcotic principle of the plant appears to reside. It contains the odour and taste in perfection; and half a grain produces headache and slight vertigo. To this principle which *I discovered*, Dr Paris proposes to give the name of *conein*."

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*Preparation of hydriodic acid.*—Dissolve sixty grains of

iodine in a sufficient quantity of alcohol; diffuse one ounce of finely divided starch through four ounces of water, and add this, drop by drop, to the former solution; allow the iodide of starch to settle, and pour off the clear liquid. Pass a current of sulphuretted hydrogen through the deposit, the colour will at first change to orange yellow from the formation of an iodide of sulphur, then it will become yellow, and ultimately white. The whole is to be filtered, the insoluble part washed with small quantities of water, and the solution slightly heated to dissipate the sulphuretted hydrogen. The solution may be obtained of specific gravity 1.5, and is pure hydriodic acid.—*Brande's Archives*, XXII. 45.

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*State of pharmacy in France.*—The great attention which is paid to the instruction of pupils in the science of pharmacy in France, may be learned from the following account of an examination of candidates for the places of pupils of pharmacy to the hospitals of Paris, condensed from the *Journal de Chemie Medicale* for July 1828.

Count Chaptal presided at the examination, assisted by Drs Jadiaux and Lallemand, M. Henry, chief of the central pharmacy, and MM. Duval, Harveng and Petroz, chief pharmacutists to the hospitals. The exercises consisted of three kinds: 1. Questions to which written answers were required; 2. Questions to be answered verbally; and, 3. Manipulations, which were performed before the board of examiners. The questions to be answered in writing, were, 1. What is gum arabic? Describe the kinds in commerce, and state their origin. 2. State the preparation of citrine ointment, its characters, and the alterations which it is liable to undergo by time, &c. 3. What is the chemical composition of opium? Give the methods of extracting morphia and narcotine. The verbal questions related to the different kinds of distillation; the nature of syrups, and their mode of preparation; the menstrua for separating the soluble parts of plants; the nature of conserves, and the general rules for



their preparation; the distinctions between cerates, pomatums, and ointments, and the general rules for their preparation. The manipulations required to be performed were, 1. To make an emulsion with turpentine; 2. To prepare whey.

The examinations having terminated, the written answers of the candidates were considered at *seven* meetings. The relative merits of the pupils were discussed by the aid of the notes taken by the examiners, and each was classed according to his proficiency.

Finally, the board of examiners, at a public sitting, announced the names of those candidates who were deemed worthy of being recommended as resident pupils, and of those also who were to be considered as provisional pupils, to fill vacancies until the next examination. A course of examinations of this kind, in which not merely the absolute, but the relative acquirements of the candidates are ascertained, must be viewed as well calculated to call forth the greatest exertions on the part of the pupils, on the principle of rivalry.—*N. Am. Med. and Surg. Journ.* October 1828.

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*State of pharmacy in Philadelphia.*—The difficulties which surrounded the Philadelphia College of Pharmacy in its infancy, are gradually yielding to the enlightened and steady perseverance of its officers and members; a healthy and vigorous action is sensibly and rapidly diffusing itself through the body: and we anticipate abundant fruits that will reflect credit upon the institution, and materially influence the prosperity of American pharmacy.

The diplomas, it is authorized to grant, are becoming an object of deep interest to the pupils, and exciting a corresponding degree of emulation, ambition, and research. Every year the number that steps forward to claim the degree of the college increases; and at an examination held on the afternoons of the 15th and 16th of April, seven candidates presented their theses for graduation, and were examined by the professors and committee appointed to be present on the occasion.



The several examinations consisted of desultory questions on the elements of chemistry, materia medica, and pharmacy. The theses were mostly respectable productions, and some of them deserve great praise for the research and talent which they indicate, as well as for the clearness and correctness of the composition, and the general neatness of execution. Though conducted with less formality, and surrounded by fewer imposing circumstances than the French examinations, yet the questions proposed to our pupils were not less difficult or various, and could not have been answered with so much ease and promptness as they were, without a familiarity, acquired by close study, with the elementary works of the several branches. The proficiency of the pupils was so satisfactory to the committee and professors, that they agreed, and informed the candidates that they would make a favourable report of their individual examinations to the board of trustees. This body will order the diplomas to be struck off, and signed by the professors of chemistry and materia medica, the president, vice presidents, and secretary of the college.

A commencement will be held, at which the degree will be conferred upon the graduates, but the diplomas will be deposited with the president, and delivered to the young gentlemen as they successively arrive at the age of twenty-one years.

The following is a list of the graduates, with the subjects of their theses:

*Charles Pleasants.* On Opium.

*William R. Fisher.* On the Preparations of Iodine.

*Joseph Head Brooks.* On Opium and the Dregs of Laudanum.

*Joseph Scattergood.* Analysis of Oak Barks.

*John Allen.* Analysis of the Wild Cherry Tree Bark.

*Franklin R. Smith.* On the Bicarbonate of Soda.

*Robeson Moore.* On the Hepatica Triloba.

# JOURNAL

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Original Communications.

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*Observations on the Protoxide of Mercury and the Atomic Weight of that Metal. By Samuel Allinson, Jun.—Read October 28, 1828.*

Perhaps no chemical fact has been considered as better established than the existence of two distinct oxides of mercury, the black and the red; but from some recent investigations it seems most probable that the former is but a mixture of the latter with metallic mercury.

During the last winter having occasion to prepare the powder supposed to be a protoxide of mercury, I did it by decomposing the protochloride with a solution of potassa. In drying it was exposed to a gentle heat, certainly not  $212^{\circ}$  Fahrenheit, and I was astonished upon finding in it globules of mercury. Being accustomed to consider it a perfect oxide I was unable to account for the phenomenon, nor could I obtain from any with whom I conversed upon the subject a satisfactory explanation. Several portions which

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I afterwards prepared also contained them; nor did I find any difference with regard to this fact whether it was prepared from the protochloride, protacetate or protonitrate of mercury, with lime-water, potassa or ammonia. The globules though often visible are not always so to the naked eye, but I have never failed to render them evident by a slight degree of friction with my finger. Percussion and elevation of temperature also produce the same effect. I am indebted to Thomas Evans for an observation which I have since repeatedly verified, that when an alkaline solution is poured on calomel, however often the latter may have beenedulcorated to remove corrosive sublimate, a reddish powder is at first apparent\*. This fact and the subsequent evidence of the existence of metallic mercury in the preparation may serve to explain each other and lead us to the conclusion (which since the commencement of my experiments I have learned is the opinion of Guibourt and Orfila, though it has certainly not been generally adopted either in this country or in England) that the protoxide of mercury is only capable of existing in combination with acids. According to this view, when a protosalt of mercury is decomposed by an alkali, the whole of the oxygen previously combined with the mercury in the form of protoxide, combines with one half of it; thus forming the peroxide, through which the remaining proportional of metal in a state of extreme comminution is mixed.

The black oxide has been considered as composed of one atom of oxygen and one of mercury, and the red oxide as containing an additional atom of oxygen: but if the experiments which I have performed with much care are correct,

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\* A careful repetition of this experiment has placed its accuracy beyond a doubt. On calomel prepared by precipitation from a solution of crystallized protonitrate of mercury with muriate of soda, and which was repeatedly washed with warm distilled water, with solution of muriate of ammonia and with warm alcohol, I poured a small quantity of potass water. A reddish powder was very distinctly observable. When sufficient alkali was added to decompose the calomel, the powder was a brownish black and contained visible globules of metal. This shows the fallacy of one of the reputed tests for the purity of calomel.



either the red oxide is a combination atom to atom, or the generally received theory in which binary compounds are considered as always more difficult of decomposition than ternary is in the present instance infringed. It is possible that the latter may be the case ; though, from the general perhaps universal correctness of the theory, it appears to me most probable that the atomic weight of mercury has been mistaken, and that it is 100 instead of 200 as stated by Davy and others.

It has been objected to the opinion that the protoxide of mercury does not exist in an insulated state, that the colour of the powder is not such as would result from a mixture of that of the peroxide with the silver colour of mercury. This difficulty may be removed by stating that other metals by a fine division of their particles lose their peculiar colour and metallic lustre (powdered gold, silver and tin for instance); and that mercury when condensed from the aerial state, before its particles have united together, is of a black colour. (See Paris's Medical Jurisprudence, Vol. II. art. Aerial Poisons.) Another more plausible objection which may be advanced, and one which for some time had considerable weight with myself, is, that the friction, percussion, elevation of temperature, &c. may each be capable of effecting the reduction of a part of the oxide. But in several instances, before resorting to either of these means, the globules have been visible to the naked eye, and in others they have been rendered visible by simply drawing my finger once over the powder, the slight pressure attending which could only have brought already existing uncombined particles within the sphere of each other's attraction. The metal may also be made apparent by pouring on the powder a minimum quantity of diluted acetic acid: the supernatant liquor will be found to contain peracetate. Protacetate is also formed; but this is owing to the presence of the metallic mercury: solutions of persalts being partially converted into protosalts by agitation with the metal. When the precipitate formed by adding potassa to the protonitrate of mercury is placed on a piece of pol-

ished gold, in a short time the surface is found to be amalgamated; an additional evidence of the existence of metallic mercury in the article in question.

In the tenth London edition of Henry's Chemistry there is reference to a paper by Brande in the Quarterly Journal of Science, Vol. XVIII. page 291, for a satisfactory refutation of the opinion of Guibourt respecting the protoxide and protosulphuret of mercury.

I have not examined the protosulphuret nor read the arguments advanced by Guibourt; but those of Brande have not effected a change in my sentiments with regard to the protoxide. He seems to consider that because the black powder obtained by decomposing protosalts of mercury with alkalis is uniform in the quantity of oxygen it contains, which is exactly half the proportion found in the red oxide, that it must be a perfect oxide. I imagine that neither Guibourt nor any one else would dispute the existence of an extensive list of protosalts of mercury, nor that the proportion of oxygen combined with the metal in these is exactly half of that in the persalts; but it is contended that the protoxide cannot be obtained in an insulated state. He also observes that "the iodide of nitrogen and fulminating silver and mercury, unquestionably chemical compounds, are decomposed by slight mechanical means." But, as has been stated, the globules are frequently visible without resorting to mechanical means or exposure to light or heat, and the reddish powder observed by T. Evans when calomel is decomposed is an incontestable evidence that the change to peroxide and uncombined metal is effected at the instant the salt is decomposed.

It may be proper here to observe that a very great difference of colour, and most probably of chemical composition, exists in the article kept by different apothecaries under the title of black or protoxide of mercury. I have found it varying from a brownish red to a light lead colour. This is doubtless owing to a difference in the mode of preparation. The "*hydrargyri oxydum cinereum*" of the London, Edinburgh



and American Pharmacopœias cannot but be considered as a very unscientific preparation, unless it is designed to contain a variable quantity of carbonate of lime. The operation must be performed with free access to the open air, as constant stirring is directed; and the light colour of the resulting powder proves that it contains either carbonate of lime or undecomposed calomel (very probably both); for the powder obtained by simple agitation of calomel with lime water, is of a brownish black colour. The boiling directed is wholly unnecessary, as lime water at the usual temperature will completely decompose calomel; and as it introduces uncertainty, it should be dispensed with. If the medical efficacy of the *black powder of mercury* renders it a desirable article in the list of the *Materia Medica*, it is absolutely requisite that more care should be bestowed in its preparation. I am induced to prefer precipitating it by means of pure caustic potash or lime water, from the proto-nitrate. If, however, instead of this, calomel be used, *ammonia* should not be employed to decompose it, as it appears to be capable of forming a triple salt. The precipitate (after washing) should be dried between the folds of bibulous paper, and carefully preserved from light, as this decomposes the per-oxide.

Whether the opinion respecting the protoxide, which I have supported, is correct or incorrect, I believe I am warranted in repeating my suggestion, that the atomic weight of mercury has been mis-stated. Henry remarks that it is "a fundamental proposition of Mr Dalton, the consistency of which with mechanical principles he has fully shown, that *that* compound of any two elements which is with most difficulty decomposed, must be presumed, unless the contrary can be proved, to be a binary one."

In another place he says, "the most simple compounds are universally the most difficult to be decomposed." This being the case with the peroxide, perchloride and persulphuret of mercury, we must suppose them to be binary compounds; and as the atomic weights of oxygen, chlorine,



and sulphur, are among the most certainly correct, the conclusion is irresistible that that of mercury is 100. An additional evidence is the fact that the only compound of mercury and cyanogen is now considered as containing two atoms of the latter to one of the former. If the weight of the metal be 100, the compound is binary.

In accordance with this view, I have prepared the annexed table of the chemical composition and corrected atomic weights of a number of mercurial salts. The analysis of some of them requires repetition before they can be regarded as completely fixed. I have been guided principally by Brande in this department.

*Table of atomic weights, &c.*

|            |   |                  |     | Corrected<br>comp. & weight. | Old theory of<br>comp. & weight. |     |                |
|------------|---|------------------|-----|------------------------------|----------------------------------|-----|----------------|
| Oxides     | { | 100 m. + 4 ox.   | 2.1 | 208                          | 1.1                              | 208 | Protoxide      |
|            |   | 100 m. + 8 ox.   | 1.1 | 108                          | 1.2                              | 216 | Peroxide       |
| Chlorides  | { | 100 m. + 18 ch.  | 2.1 | 236                          | 1.1                              | 236 | Protochloride  |
|            |   | 100 m. + 36 ch.  | 1.1 | 136                          | 1.2                              | 272 | Perchloride    |
| Iodides    | { | 100 m. + 62 i.   | 2.1 | 325                          | 1.1                              | 325 | Protiodide     |
|            |   | 100 m. + 124 i.  | 1.1 | 225                          | 1.2                              | 450 | Periodide      |
| Sulphurets | { | 100 m. + 8 s.    | 2.1 | 216                          | 1.1                              | 216 | Protosulphuret |
|            |   | 100 m. + 16 s.   | 1.1 | 116                          | 1.2                              | 232 | Persulphuret   |
| Cyanide    | { | 100 m. + 26 c.   | 1.1 | 126                          | 1.2                              | 252 | Cyanide        |
| Hydriodate | { | 208 ox. + 125 a. | 1.1 | 334                          | 1.1                              | 334 | Hydriodate     |
|            |   | 208 ox. + 54 a.  | 1.1 | 262                          | 1.1                              | 262 | Protonitrate   |
| Nitrates   | { | 108 ox. + 54 a.  | 1.1 | 162                          | 1.2                              | 324 | Pernitrate     |
|            |   | 432 ox. + 54 a.  | 4.1 | 486                          | 2.1                              | 486 | Subpernitrate  |
|            |   | 108 ox. + 216 a. | 1.4 | 324                          | 1.2                              | 648 | Bipernitrate   |
|            |   | 208 ox. + 108 a. | 1.2 | 316                          | 1.2                              | 316 | Bipronitrate   |
| Sulphite   | { | 208 ox. + 32 a.  | 1.1 | 240                          | 1.1                              | 240 | Sulphite       |
|            |   | 208 ox. + 40 a.  | 1.1 | 248                          | 1.1                              | 248 | Protosulphate  |
| Sulphates* | { | 108 ox. + 40 a.  | 1.1 | 148                          | 1.2                              | 296 | Persulphate    |
|            |   | 216 ox. + 40 a.  | 2.1 | 256                          | 1.1                              | 256 | Subsulphate    |
|            |   | 108 ox. + 80 a.  | 1.2 | 188                          | 1.4                              | 376 | Bisulphate     |
| Phosphates | { | 208 ox. + 28 a.  | 1.1 | 236                          | 1.1                              | 236 | Prophosphate   |
|            |   | 108 ox. + 28 a.  | 1.1 | 136                          | 1.2                              | 272 | Perphosphate   |
| Carbonates | { | 208 ox. + 22 a.  | 1.1 | 230                          | 1.1                              | 230 | Protocarbonate |
|            |   | 108 ox. + 22 a.  | 1.1 | 130                          | 1.2                              | 260 | Percarbonate   |
| Borates    | { | 208 ox. + 22 a.  | 1.1 | 230                          | 1.1                              | 230 | Protoborate    |
|            |   | 108 ox. + 22 a.  | 1.1 | 130                          | 1.2                              | 260 | Perborate      |
| Arseniates | { | 208 ox. + 71 a.  | 1.1 | 279                          | 1.1                              | 279 | Protoarseniate |
|            |   | 108 ox. + 71 a.  | 1.1 | 179                          | 1.2                              | 358 | Perarseniate.  |

\* The crystallized protosulphate contains two atoms of water. Its atomic weight, therefore, is  $248 + 18 = 266$ .

*Remarks on the Preparations of Iodine and their Compounds; extracted from an Inaugural Thesis by W. R. Fisher.*

The progressive increase of the demand for the preparations of iodine which has attended it since its first introduction into the *Materia Medica* by Dr Coindet of Geneva, as well as the unsettled state in which the formulæ for the constitution of most of its pharmaceutic compounds exist, we trust will be deemed sufficient cause for the following remarks at this time.

Should they even serve no better purpose than to call the attention of the two professions of medicine and pharmacy to the necessity of adopting some certain formulæ which should increase the facility of prescription and insure to the patient the exact dose intended by his physician, the labour spent in their compilation will be fully requited.

The original prescriber, Dr Coindet, recommended the ioduretted hydriodate of potash; and the great diversity of opinion on the most proper mode of exhibition has led to as great a diversity of formulæ, viz. the tincture of iodine, solution of iodine, liquor of iodine, solution of the ioduretted hydriodate of potash, the iodides of sulphur, the iodides of mercury, ointment of iodine, liniment of iodine, ointment of iodine and calomel, ioduretted sulphuric ether, and ointment of iodide of zinc.

Tincture of Iodine—

R.—Iodine, gr. 48,  
Alcohol, 3j. m. ft. tinct.

This is the recipe of Dr Coindet. Magendie's recipe is similar, with the exception of directing the density of the alcohol employed to be 35 degrees Beaumé's areometer. In a recipe procured from a gentleman of this city, who we believe extracted it from a French treatise on the subject,



the iodine is directed in the proportion of twenty-four grains to an ounce of alcohol.

In a communication by Dr Fahnestock on this subject\*, it is recommended, that the tincture should be made of half a drachm of iodine, to the same quantity of spirit as directed by the others; and the author complains of the tincture of Magendie, as being too strong. This may be accounted for by the difference in the weights employed in English and French pharmacy. On this subject the *Journal de Pharmacie* contains the following remarks: "at Geneva and in France where the preparations of iodine were first employed, it was directed to use for the tincture, forty-eight grains to an ounce of alcohol; but the grain intended was the "*poids de marc*." While in other parts of Switzerland and Germany, the *medicinal weight of Nuremburg* was employed; and in England the *troy weight*. The division by these of the scruple is into twenty grains, while by the "*poids de marc*" it is into twenty-four grains.

Hence, in the largest part of Switzerland and Germany, and in England, a tincture was prepared stronger by one-fifth than that which was intended. Attention to this difference of weights, should always be observed in the translation of the recipes from the French.

From our own observation in the preparation of this tincture, we feel induced to concur with Dr Fahnestock, in recommending the employment of half a drachm to the ounce, which forms nearly a saturated tincture with the alcohol of the shops, varying from 33 to 35 degrees Beaumé. At all events a specific standard should be adopted; and the preparation of so important and powerful a medicine be no longer left to arbitrary opinion. In the recipes above quoted, the strength varies 100 per cent. from the weakest up to the strongest directed. An author already referred to gives the following caution respecting the tincture. "It has been ascertained, that when suffered to stand any time it deposits crystals; and may form the ioduretted hydri-

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\* American Journal of the Medical Sciences, February 1829.



dic acid: it should therefore be prepared for immediate use, and in small quantities." This deposit of crystals has never come under our notice, although we have frequently seen the tincture upwards of three or four months old.

May not the deposit of crystals be owing to supersaturation, or a partial evaporation of the alcohol?

Liquor of Iodine—

R.—Potass. hydriodat. gr. 36 = 30 *troy*.  
 Iodine, gr. 10 = 8 *troy*.  
 Aq. distillat. 3x. m. ft. solut.

This recipe is only a weaker solution of the ioduretted hydriodate of potash than the following directed by Dr Coindet:

R.—Potass. hydriodat. gr. 36 = 30 *troy*.  
 Iodine, gr. 10 = 8 *troy*.  
 Aq. distillat. 3j. m. ft. solut.

By this formula the strength is ten times greater than by the preceding, which should be called by a name more expressive of its constitution. It may otherwise be mistaken from its similarity of title for the solution of iodine, which differs from it essentially in composition.

Solution of Iodine—

R.—Potass. hydriodat. gr. 24 = 20 *troy*.  
 Aq. distillat. 3j. m. ft. solut.

Under the name of solution of hydriodate of potash, Magendie gives the following formula, slightly differing from the preceding:

R.—Potass. hydriodat. gr. 36 = 30 *troy*.  
 Aq. distillat. 3j. m. ft. solut.

This may be converted into the solution of the ioduretted hydriodate of potash, by simply adding ten grains of pure iodine to it.

Iodides of Sulphur—

The iodides of sulphur may be made by applying a moderate heat to a direct combination of the two substances. The American Journal of Medical Sciences, for May 1828, contains an extract from the "Journal des Progrès," &c. Vol. VI. from which the following information is collected rela-

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tive to these iodides employed as medicinal agents. From Dr Biett's experiments with the iodides of sulphur, he is induced to conclude that they are among the most active agents for the cure of cutaneous diseases; but that they must be used with caution. They are to be mixed with some fatty matter, in the proportion of a twenty-fifth, a twentieth, or a sixteenth. With this knowledge of the strength of the remedy, it may, perhaps, be as well left to extemporaneous prescription, especially as all the compounds of iodine are so readily affected by light, and so easily decomposed.

#### Iodides of Mercury.—

These compounds have recently attracted a degree of attention from their application to the treatment of syphilis. Of the two iodides there are several formulæ for pills, ointment, solutions, &c. but for reasons already given of the facility with which preparations decompose, we have thought it as well to omit noticing them here; believing that every practitioner would become fully acquainted with their doses and powers, and that none of them may be properly considered officinal. For the method of preparing them the following directions are subjoined:

#### Protiodide of Mercury—

Take of crystallized pronitrate of mercury, 100 parts,  
distilled water, 400 parts.

Dissolve the salt in the water, and add a solution of hydriodate of potash until a precipitate is no longer formed. A yellowish green precipitate is procured, which must be separated by a filter. This must be washed with distilled water, until the water which passes over no longer affords a precipitate with potash. The powder must then be dried, and preserved in bottles secured from the light. According to Mr Thomson, the constitution of the protiodide is,

1 atom iodine, 124,  
1 atom mercury, 200,

---

324, the atomic weight of  
this iodide of mercury.



## Deutiodide of Mercury—

Deutochloride of mercury, 70 parts,

Hydriodate of potash, 100 parts.

Each salt to be dissolved separately in water. The solutions are then to be mixed, in small quantities. A red powder will be precipitated, which must be caught on a filter and washed with great care, until the water passes over free of taste. The precipitate must then be dried and kept in bottles, secluded from the light. Its composition is,

2 atoms iodine, 248,

1 atom mercury, 200,

---

448, the atomic weight or combining number.

Both these iodides are insoluble in *water*, but are soluble in a solution of hydriodate of potash.

## Ointment of Iodine—

R.—Hydriodatis potassæ, 3ss. = 24.6090 *troy*.

Axung. 3j. m. ft. ung.

## Ointment of Hydriodate of Potash—

R.—Hydriod. potassæ, 3ss. 24.6090 *troy*.

Ung. simplicis, 3iss. m. ft. ung.

These preparations differing in name are very similar in constitution. The former being, as is apparent, rather the stronger. These may readily be converted into ointments of the ioduretted hydriodate, by adding 10 or 15 grains of iodine to the above quantity.

## Liniment of Iodine—

R.—Tinct. iodine, 3j.

Linim. saponis, 3j. m. ft. linim.

The strength of this liniment must necessarily vary, so long as the varieties in the strength of the tincture, as we have endeavoured to point out, continue to exist.

## Ointment of Iodine and Calomel—

R.—Iodine, 1 part,

Calomel, 1½ parts,

Axung. 48 parts.



The iodine to be first mixed with the lard, and the calomel added. This recipe is extracted from the N. A. Med. and Sur. Journal for October 1827. It is submitted by Messrs Planche and Souberaine, as calculated to meet indications, where the effects of iodine and calomel are both required, and not in a state of chemical combination. "In other proportions of these ingredients there is a decomposition of the calomel by the iodine: and either *corrosive sublimate* and the *deutiodide of mercury* are produced; or if the iodine be in excess, the surplus remains mixed with the two salts; or finally, if the calomel be in excess, there results a mixture of *undecomposed calomel*, *corrosive sublimate*, and the *protiodide of mercury*, with a small portion of the *deutiodide*." Some experiments, which we have instituted to test the accuracy of these assertions, appear to correspond fully in their results.

An indispensable requisite to the complete formation of this ointment, is the solution of the iodine in a few drops of alcohol, previous to adding the lard; otherwise, owing to its unctuousity, it is impossible to pulverize it, and, of course, to distribute it equally throughout the mass.

Ioduretted Sulphuric Ether—

R.—Iodine, gr. 6 = 4.9223 troy.

Ether. sulph. 3j. ft. solut.

"This preparation contains in thirty drops of it one grain of iodine." This, of course, must vary, with the density of the ether, and the size of the vessel from which it is dropped.

Ointment of Iodide of Zinc—

R.—Iodide of zinc, 3j.

Ung. simplicis, 3j. m. ft. ung.

This has been recommended by Dr Ure, to replace the ointment of hydriodate of potash.

*Remarks on the Bicarbonate of Soda; extracted from an Inaugural Thesis, by Franklin R. Smith.*

Under the title of sodæ carbonas the American and British pharmacopœias direct the preparation of what has generally been considered the bicarbonate of soda.

The American pharmacopœia directs it to be prepared by the decomposition of the sesquicarbonate of ammonia, which at the time of its adoption was the process of the Edinburgh college. The carbonic acid contained in the quantity of sesquicarbonate of ammonia prescribed by the colleges, Mr Philips has shown to be insufficient to saturate the soda. Since that period the Edinburgh college has rejected the process entirely, and adopted one similar to that of the London college.

The two colleges now agree in directing it to be prepared by transmitting carbonic acid gas through carbonate of soda in solution; but differ in the temperature at which the subsequent evaporation should be conducted. The directions of the London college are preferable, inasmuch as by them 120 degrees Fahrenheit are to be employed, which is 60 degrees less than the prescription of the Edinburgh college.

The processes above detailed were supposed to afford the bicarbonate of soda until the researches of Mr Philips showed the resulting salt to be a sesqui instead of a bicarbonate. Since the promulgation of his experiments, the opinion has obtained here that the ordinary bicarbonate of our shops was likewise a sesquisalt. A knowledge of the fact that the process by which it is prepared is different from that of the colleges, and from any mentioned in our chemical authors, induced an examination of the article, the preparation of which is conducted as follows.

Carbonate of soda in its ordinary state is placed in a box contrived for the purpose and surrounded by an atmosphere of carbonic acid gas, under pressure. The salt absorbs the



gas, and as the new compound combines with less water than was contained in the old, a considerable quantity of fluid drains off. When the gas ceases to be absorbed, the salt is removed and dried.

Upon inspection of the apparatus after the cessation of the process, the salt is seen retaining the original form of the pieces submitted to the action of the gas, but its structure from being compact is now loose and porous, its vitreous lustre and fracture are also lost, a new arrangement of its particles having taken place as is evinced by the altered texture of the mass. This presents the appearance of numerous crystalline grains aggregated together, having a beautiful snow-white colour and slightly alkaline taste.

The advantages arising from this method are,

1. The previous solution directed by the colleges is rendered unnecessary.
2. A much larger quantity of solid matter can be operated upon in vessels of equal dimensions.
3. The subsequent evaporation and crystallization directed by the colleges, are in a great measure dispensed with, and the expenditure of time and labour attending the dissipation of so large a quantity of water as is directed, particularly in the London formula, is saved.

These advantages have given this process the preference. Care however is required to continue the production of the gas a sufficient time, because owing either to neglect of this particular or to the temperature employed in drying, the different specimens of the salt do not contain an equal proportion of carbonic acid. This is shown by the following experiments.

A. 100 grs. of the ordinary bicarbonate of the shops were added to dilute sulphuric acid: the loss by this treatment was 49 grs.

B. Another portion of 100 grs. of the same was subjected to a red heat for one hour: and lost 36 grs. The 64 grs. remaining were treated with dilute sulphuric acid and sustained a further loss of 23 grs.



The composition of the ordinary bicarbonate of soda, as deduced from this analysis, which was repeated with exactly the same result, is,

|                |       |
|----------------|-------|
| Carbonic acid, | 49    |
| Soda           | 41    |
| Water          | 10    |
|                | <hr/> |
|                | 100   |
|                | <hr/> |

The mean of two analyses of the salt prepared by another manufacturer gave,

|                |       |
|----------------|-------|
| Carbonic acid, | 44    |
| Soda,          | 41    |
| Water,         | 15    |
|                | <hr/> |
|                | 100   |
|                | <hr/> |

An examination of the salt of a third establishment noted for the purity of its preparations, yielded the same result as the first; and as this is confirmed by the experiment of the committee of the Franklin Institute, I am disposed to consider it as affording a correct view of the composition of the salt usually sold in this city.

It has become so customary to correct the results of analyses by the atomic theory, that the latter is considered a criterion of the correctness of the former. A glance at the above statement shows that it does not agree with the multiple system: and from the well established truth of that system, the fact induced a further examination. Thus, to have constituted the bicarbonate, the 41 parts would have required 56.+ parts carbonic acid, or to form the sesquicarbonate 42.+ parts of the same acid, whereas 49, the actual quantity, is almost exactly intermediate.

To determine whether the result obtained was owing to admixture of the carbonate with the bicarbonate, a portion of the recently prepared granular mass was washed with a small quantity of water, and dried at the temperature of

100° F. It was then pulverized, wrapped in blotting paper, and submitted to pressure 12 hours, in order to remove all hygrometric moisture. With it the following experiments were performed :

A. 50 grains were treated with dilute sulphuric acid : lost 26 grs. giving 52 parts carbonic acid in the 100.

B. 75 grs. tartaric acid, freed from hygrometric moisture, were added in solution to 85 grs. washed salt, also in solution. After the effervescence had ceased, the solution was heated to ebullition. On testing with litmus paper, turmeric paper browned, and turmeric paper, no immediate effect was produced; but after 24 hours' immersion, the turmeric paper had become a shade darker, showing a very slight alkaline excess. From these facts it was deduced that the salt was a perfect bicarbonate, composed of

|                |        |
|----------------|--------|
| Carbonic acid, | 52.    |
| Sóda,          | 37.818 |
| Water,         | 10.182 |

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100.

proving the correctness of the conjecture that the previous results were influenced by a portion of carbonate, mechanically retained. When the granular mass is removed from the apparatus to be dried, from its porous texture it retains a large portion of water, holding in solution carbonate of soda; this dries with the mass, and is thus equally distributed, reducing the relative proportion of carbonic acid. That this is the mode in which the mixture occurs, is proved by the fact that the same results were obtained, whether the granular or pulverized salt was employed.

Whether the process would not be improved by pressing the salt immediately on its preparation while still wet, or by washing it with a small quantity of water, or by a combination of these means, is left to the consideration of the profession.

Mr Philips is of opinion that the bicarbonate of soda cannot exist in a dry state, since by drying it is reduced to a sesquicarbonate. This opinion is controverted by the ex-



periments of Dr Thomson, who prepared a perfect bicarbonate, by exposing a concentrated solution of carbonate in a brewer's vat. The experiments above detailed also militate against his opinion.

There are reasons for believing that the anhydrous bicarbonate combines with water in two proportions, viz. atom to atom, and one atom to two atoms; but further experiments are necessary to decide the question. For preparing the bicarbonate the French carbonate is preferred.

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*Remarks on Quercia, a new Substance discovered in the Bark of the Quercus Falcata; extracted from an Inaugural Thesis by Joseph Scattergood.*

The following results were obtained in a course of experiments instituted with the view of ascertaining the chemical constituents of the bark of the quercus falcata, or Spanish oak. A portion of the bark had been digested in ether, alcohol, and water successively; and all the principles soluble in these liquids extracted. The residuum was of a yellowish colour, without smell or taste. When this was well concentrated by boiling in water acidulated with sulphuric acid, in the proportion of about 2 drs. of the acid to 4 or 5 oz. of water, and the liquor filtered while hot, a large quantity of white acicular crystals was produced. By separating the first product, and concentrating, either by further boiling or slow evaporation, and digesting the remaining bark in another portion of acidulated water, an additional quantity of the same kind of crystals may be obtained. By this process I have separated as much as 70 grs. from 3iv. of the bark.

To an acidulous solution of these crystals was added bicarbonate of soda, in sufficient quantity to neutralize the



acid, upon which a white powder subsided, which, after careful edulcoration, was inodorous, tasteless, and entirely insoluble in ether, alcohol, or water, either hot or cold. It forms the base: and, from my having obtained it from six different species of quercus, and its properties characterizing it as a substance *sui generis*, I have given it the name of quercia.

This substance, from its want of taste and its insolubility in the ordinary menstrua, appears to have more analogy to the earths than the alkalies; it differs from all the former at present known, by forming insoluble salts with the mineral, and *not* combining with the vegetable acids. The quantity obtained from the bark was so great that it led me to suppose I had permitted some foreign substance to be mingled with it; but the experiments have been frequently repeated upon different parcels and species, and with so much care that it entirely precludes the possibility of a mistake.

This substance unites freely with the mineral acids; but the vegetable, such as the acetic, oxalic, tartaric and citric, have no perceptible effect upon it. The sulphate crystallizes in acicular crystals, which are perfectly insoluble in ether, alcohol, water, or solutions of the neutral salts; and when carefully edulcorated with water, are not blackened by the most intense heat I have been able to apply. When thrown upon a red hot iron, its crystalline form is destroyed. It may be redissolved in boiling diluted sulphuric acid, but the greater part of it subsides again upon the solution cooling, unless it is in very small quantities. The acid solution of it is not affected by the solution of oxalate of ammonia, oxalic acid, nitrate of silver, per-chloride of mercury, tartrate of antimony, ferro-cyanate of potash, or the nitric or muriatic acids. All the alkalies, alkaline carbonates, and magnesia decompose it: quercia, in the form of a white insoluble powder being precipitated. Alcohol, when added to the acid solution, throws it down as a flocculent precipitate.

The nitrate forms lamellated crystals, which are as tasteless and insoluble as the preceding; the acid solution is not

affected by any of the reagents mentioned in the experiments on the sulphate. Quercia may be thrown down by the alkalies, alkaline carbonates, and magnesia. It is also decomposed by sulphuric acid.

The muriate crystallizes in acicular crystals, which aggregate in stars when the solution is slowly evaporated. They are also tasteless and insoluble: and the acid solution is not altered by any of the tests mentioned in the experiment upon the sulphate, except the nitrate of silver, which forms an immediate copious precipitate.

Quercia, and its nitrate and muriate, when thrown upon red hot iron, are immediately decomposed, a dark grey powder being left.

The muriate may be obtained by boiling the bark in water acidulated with muriatic acid, as well as by the direct union of its constituents.

When the bark was boiled with water acidulated with nitric acid, the acid was decomposed, and a bright yellow spongy mass was the only result. The average loss of 400 grains of barks of different thicknesses, after the action of ether, alcohol, and water, was 70 grains, but not much more than half that quantity of quercia could be obtained from each by precipitation with alkaline carbonates.

The residue, after the various operations necessary to obtain all the constituents, is a light yellowish, entirely tasteless and inodorous substance, and may probably be considered as woody fibre, nearly pure.

From the various experiments detailed in the thesis, 400 grains of the bark of the quercus falcata, or Spanish oak, of ordinary thickness, appear to be composed of

|                          |           |
|--------------------------|-----------|
| Tannin                   | 40 grains |
| Gallic acid              | 26        |
| Oily and resinous matter | 10        |
| Extractive               | 6         |
| Quercia                  | 70        |
| Residue, or woody fibre  | 248       |

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400



Quercia, and its salts, from their insolubility, are not likely to prove of much medicinal importance.

I have taken upwards of 10 grains without perceiving any effect, and 3j. of the sulphate was given to a full grown dog without producing any perceptible action upon him.

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*Remarks on the Preparation of Blue Mass. By Elias Durand.*

Different formulæ have been recommended for the manufacture of the blue pill, and several substances employed to receive and divide the mercury, such as manna, molasses, honey, conserve of roses, &c. The great imperfection of this preparation, as we generally find it, is the facility with which it becomes dry and hard. By this alteration the minutely divided particles of the metal, deprived of the former viscosity of the ingredients of the mass, unite by their mutual attraction, and form visible, and sometimes tolerably large globules; or, in other words, the mercury is revived. Thus the blue mass is so much impaired in its medicinal properties, as to be unfit for use.

This obvious defect induced me, many years ago, to perform experiments, with the view to discover some substance which, while it would extinguish the metal, would also prevent this alteration. Ultimately I found that *honey* was decidedly the best article for this purpose; nor do I hesitate to say, although it is stated in the American Dispensatory that honey had been rejected because it produced griping, that in the blue mass it is altogether harmless, being introduced in such small quantities as in no way to interfere with the ordinary action of the medicine.

The preparation, obtained by the employment of honey, possesses the advantage of keeping for years in a proper



consistence for forming pills; and the addition of some mucilage of gum arabic has enabled me, by its viscosity, to obtain a perfect mass with much less labour than any process recommended in the pharmacopœias, or any other that I have tried. Indeed, I consider my success so complete in the formation of this compound, that it affords me great pleasure to offer my formula for publication, in the expectation that it may be beneficial to our pharmacutists.

|                         |                     |
|-------------------------|---------------------|
| R.—Mercury              | 4 parts             |
| Inert vegetable powder* | 3 parts             |
| Gum arabic              | 1 part              |
| Liquid honey            | 4 parts, or nearly. |

Mix the gum with half of the honey, and to this add the mercury. Let them be triturated without intermission, if possible, until no globules can be perceived by the aid of a good glass; then add the other ingredients. By proper exertion one pound of this mass may be thus prepared in the space of one hour or one hour and a half, and every three grains of it will contain one of the divided mercury.

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*On the Non-Existence of Oxide of Mercury in Blue Pill and Blue Ointment. By Samuel Allinson, Jun.*

Since the demonstration by Lavoisier of the true constitution of metallic oxides, the pharmaceutical preparations of mercury by trituration have been considered as owing their remedial powers to the presence of an oxide, formed by a combination of the oxygen of the air with the metal. Previous to this time, I believe, from reference to some of the old dispensatories, it was not considered that any chemi-

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\* The liquorice or marsh mallow root is preferable to starch. The mass prepared with the marsh mallow, in powder, possessed the finest colour.

cal change took place, but merely that the mercury was finely divided. None of the older writers speak of its conversion into a "calx."

My attention being directed to the subject, I was led to a belief that it is at least very improbable that these preparations contain any oxide of mercury.

It is a fact with which every apothecary must be familiar, that the pilulæ hydrargyri, and the unguentum hydrargyri of the shops, always contain a considerable proportion of metal which is not oxidized, visible either to the naked eye or with the aid of a microscope, and easily separable by washing away the other substances with which it is combined. He must also be familiar with the change through olive green and black to blue, of the unguentum oxidi hydrargyri rubri, with the ordinary exposure in the ointment pots of the shops\*. In this state it is perfectly analogous to the blue ointment prepared by trituration. When washed with an alkaline solution, uncombined mercury separates.

The conclusion is obvious and irresistible, that if unctuous substances deoxidize the oxide of mercury, it is impossible that, by mere trituration of metallic mercury with the same substances, it should be oxidized.

Turner doubts the truth of the generally received opinion, that mercury may be oxidized by agitation with atmospheric air, and thinks it probable that its oxidation in the Ethiops per se of Boerhaave, "was solely owing to the presence of the other metals." But even supposing that mercury may be oxidized by this means, it does not render it probable that a similar change is effected in the preparation of blue mass and ointment. For 1. The conserve, honey, or other adhesive substances used in preparing the mass, and the lard in the ointment, *effectually prevent the contact of air* with nearly all the metal employed. 2. The time required for

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\* When carefully excluded from light and air, this change does not take place unless resin cerate has been employed in the preparation. In one instance I observed, it appeared to be converted into a carbonate.



oxidation with free access of air\* proves that this cannot take place in the comparatively short time in which these articles are prepared with an obstructed access. And 3. Admitting the formation of an oxide, it would, in the case of the ointment, be so speedily reduced by yielding its oxygen to the lard, that it could not owe to it its efficacy.

Finding that this reasoning, though satisfactory to myself, was not so to some with whom I conversed, I endeavoured, by experiments several times carefully repeated, analytically to prove its truth.

I first washed some well prepared mercurial ointment with a solution of potassa, and suffered the resulting saponaceous liquor to stand for several days to deposit finely divided mercury or oxide. Pouring off the liquor, part of the metallic residue was in running globules, and part so minutely divided as to be of a black colour. This I boiled in acetic acid, which however did not act upon it. Its colour is not a proof of its being an oxide. I have observed mercury, when sublimed in a glass vessel and washed from the sides with water, assume a similar appearance, yet remain unacted upon by acetic acid. Friction or pressure immediately converts it into globules.

The blue mass upon which I operated was from Apothecaries' Hall and William Allen's, London, and each parcel of a very excellent quality. I boiled it in successive portions of distilled water until all the soluble matter was dissolved, then digested the residue in acetic acid with heat. No acetate of mercury was formed.

If these experiments have been accurately performed, it must follow as a necessary corollary that the subjects of them contained no oxide of mercury. This fact, which is now generally admitted in France, though denied in the British and American dispensatories, overturns the long es-

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\* According to Dr Duncan, the phial containing the metal upon which Boerhaave experimented, was for fourteen years attached to the wing of a wind-mill.



established maxim in therapeutics, that metallic mercury is perfectly inert when internally administered.

This hypothesis derived its main support from the fact that when a large quantity of mercury in the metallic form was given to overcome constipation by its gravity, it passed from the system without leaving any impression behind it. But the truth of the position might have been questioned, by recurring to the effect of mercurial vapours on looking glass makers; they being subject to salivation, though the metal is only presented in a state of minute division, the oxide not being vaporizable. It would appear, however, that although a union of oxygen with this metal is not essential to its sialagogue powers, it must be in a state of extreme comminution to insure this action, as it is well known that it was freely used in the reign of Charles II. as a cosmetic, and passed from the bowels in a brilliant and uncontaminated form without exerting any agency over the general system.

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*An Analytical Memoir on Tobacco. By Columbus C. Conwell, M.D.*

Tobacco, whether viewed as a chief article of American export, as a staple of many of our states, or as an article of almost universal consumption, is a plant whose accurate analysis must be of the highest importance. That it contains, like opium, an anodyne substance, we have every reason to believe from its effect on organic surfaces; and that, like opium, it also contains a poisonous principle is equally demonstrable from the fatal experience of many who have taken it into their stomachs. If analysts would direct their attention to the detection and separation of these two principles, instead of labouring to ascertain the relative quanti-

ties of resin, gum, mucus, colouring matter, salts, lignin, &c. they would perform a work far more useful to medical science, more interesting to scientific men and more important to the immense multitude that use tobacco.

The few following experiments were performed with a view of advancing in some measure the knowledge of the constituents of this plant:

To two quarts of a strong infusion of tobacco leaves, three ounces of pure aqua ammoniæ were added: a copious brownish yellow cloud soon gathered and descended. This precipitate was composed of the alkaline substance which I have termed *Nicotia*, slightly contaminated with other vegetable matters. Retained on the filter and dried, it assumed a purple black colour not unlike iodine, and lost the nauseous taste it possessed beforeedulcoration.

*Nicotia* is tasteless, inodorous, uncrystallizable and destructible by heat. It is insoluble in water and alcohol, and combines with the acids, forming nearly insoluble salts. The principal peculiarity of *nicotia*, and one sufficiently distinctive, is that of its striking with all the acids a red or light claret colour. Though many circumstances prove it to be totally distinct from lime, as its precipitation by pure ammonia, the phenomenon of its combination with the acids, the habitudes of its muriate, &c. still it must not be concealed that all its salts are precipitable by oxalate of ammonia.

After precipitating by pure ammonia, I was surprised to find my preparation in the state of carbonate, as it caused a violent effervescence with acids; but it was found that, previous to precipitation, the process of fermentation had commenced, and a portion of the carbonic acid, which was pretty copiously evolved, combined with the *nicotia*.

*Sulphate of nicotia* crystallizes in acicular fragments, insoluble in water and alcohol, and nearly tasteless.

The *hydrochlorate* aggregates in small indistinct crystals, apparently insoluble, or held in suspension like a precipitate. It has a bitter astringent taste.

The *nitrate* could not be obtained in a crystalline form.

The *tartrate* is insoluble.

The tobacco leaves, after being deprived of all matter soluble in cold water, were transferred to ether, and suffered to remain in digestion a week. On filtration and spontaneous evaporation of the ethereal tincture, a thick greenish yellow oil remained in the evaporating vessel. This oil derives its colour from the chlorophyllin of the leaves. It possesses the peculiar odour of tobacco, with an intensely acrid and loathsome taste, and most probably concentrates all the virulent energies of the plant.

Starch does not exist in the pure Virginia leaf, at least iodine does not indicate its presence in a transparent decoction of the leaves, first acted on by cold alcohol and ether; and we can only account for M. Vauquelin's asserting the reverse by supposing that he experimented upon impure tobacco.



## Selected Articles.

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### *On Plasters.*

Plasters are those medicinal preparations, used externally, possessing sufficient consistence to adhere to the skin without melting, and whose base is composed of fatty substances.

Among the various compounds designated under the name of plasters, some owe their consistence to wax and resins, others to metallic oxides.

The first are simple mixtures, accomplished after the liquefaction of all the ingredients entering into their composition. The second are the result of a true combination procured by the reaction between the constituent principles of the fatty substances and the metallic oxides with which they are combined.

Some authors, and particularly those of the Batavian Pharmacopœia, have used the name of plaster where it did not properly belong\*.

M. Deyeux has proposed to reserve this appellation for the designation of compounds produced by the action of greasy bodies upon metallic oxides, and to give to others the name of *solid ointments*.

M. Chéreau has proposed to range among the salts those plasters which are made with metallic oxides, and, in conformity with the principles of chemical nomenclature, has

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\* Annales de Chimie. Tom. LVIII. p. 32.

called them oleo-margarites, a name indicating their composition.

M. Henry, to whose useful labours the science of pharmacy is so much indebted, has, in order to avoid the inconvenience always produced by the introduction of new words into the language of pharmacy, taken into view their consistence only, and, while preserving their name, has distinguished them as *plasters by mixture* and *plasters by combination*. The former are the *solid ointments of the codex*. The latter, plasters, properly so called. Before passing to the general rules which apply in their preparation, it will be proper to obtain a solution of the following questions:

1. Among the greasy substances and the metallic oxides, which are those best adapted for combination, and consequently for the formation of plasters?

2. What are the degrees of temperature that ought to be observed?

3. What signs indicate the completion of the process?

4. What are the phenomena that occur during their preparation, and what is their nature?

5. What alterations are these compounds liable to undergo, and what are the means of preventing them?

M. Henry, in an essay read before the Société de Pharmacie, has described with great precision those oily substances and metallic oxides best calculated for the preparation of plasters; and from his experiments he has drawn the following conclusions:

*Among the fatty bodies, olive oil is the only one proper to be combined with metallic oxides. Of all the metallic oxides, those of lead are alone adapted for combination with greasy or fatty substances.*

*Litharge (protoxide of lead melted) is the only oxide of that metal which forms a good plaster.*

*The English litharge should always be preferred.*

The experiments which induced M. Henry to admit the above results were performed with the oils of carnation and the castor bean, upon the English litharge, upon that of

Hamburg, upon the red oxide of lead (deutoxide or minium), the yellow oxide (massicot), and finally, upon the oxides of iron and manganese.

*Of the degree of temperature to be observed.*—The degree of heat requisite in the formation of plasters, varies according to the nature of the preparation. In the preparation of those by simple mixture, a low temperature should be employed, sufficient only to liquefy the fatty and resinous substances. For if the fire be not conducted with caution, a part of the mixture will be burnt, or its consistence changed; a result depending upon a partial decomposition of its constituents, or a separation of some volatile principle; thus, for instance, in preparing a plaster at too elevated a temperature, of which turpentine forms an ingredient, or any other resin containing a volatile oil, the latter will be disengaged, and the resin becoming more solid, the consistence of the plaster will be increased. In preparing plasters by combination or chemical union, two different degrees of heat are employed: the one equal to that of boiling water—the other superior to it. In the latter case the object is to carbonize a part of the fatty substances. These bodies are heated over the naked fire, and the metallic oxide added in a state of minute division, in order that the combination may be speedily effected; because a certain quantity of separated carbon might occasion the reduction of the metal. When it is desirable to prepare a plaster without its component parts undergoing this alteration, the reaction of the ingredients is facilitated by submitting them to the temperature of boiling water; and this may be best effected by pouring water into the vessel employed in the operation. The particles of the mixture are thus kept in motion by the ebullition of the water, and prevented from coming in contact with the bottom of the vessel. The water is an intermediate substance, performing the function of a bath.

*Of the signs which indicate when plasters are finished.*—*Plasters by mixture* are finished when all the substances



which compose them are liquefied, and present a homogeneous mass.

With respect to those which are the result of combination, the criteria are as follows : 1st, when the metallic oxide has entirely disappeared ; 2d, when the colour of the plaster has undergone a complete change from that of the oxide ; 3d, when the consistence is such that a perfect plaster can be formed when thrown into water, without its adhering to the fingers.

The consistence of the former depends upon the nature and proportions of the substances employed. That of the latter, from new combinations effected by the change which occurs during the reaction of the ingredients. Both should readily soften between the fingers, and when applied over the palm of the hand, should adhere to it, and afterwards be detached without leaving behind a trace of plaster. They should also require for their liquefaction a greater degree of heat than naturally exists in the parts which they are destined to cover.

*Of the composition of plasters by combination, and the phenomena which present during their preparation.*—The formation of these plasters ought to be regarded as a saponification, the litharge having upon grease and oil an action analogous to that of soda and potash upon fatty bodies. There result from this action the stearic, margaritic\*, and oleic acids, and glycerine.

The acids unite with the oxide of lead, and form salts ; the glycerine remains in solution in the water which has served as a bath during the preparation of the plaster. It has been observed that the presence of air is not essential to the production of these phenomena, which may occur in vacuo. The same cannot be said of water ; it is indispensable for the saponification of the greasy bodies.—(*Vide the work of M. Chevreul, Paris, 1823*†.)

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\* If olive oil be used, the production is stearic and oleic acids, and glycerine.

† Attempting to form lead plaster, the emplastrum plumbi of the pharmacopœia,

By treating simple plaster with very dilute nitric acid, at a gentle heat, it will appear that it is a compound resulting from the union of acids with the oxide of lead. The latter is dissolved by the acid, and the acidified grease separated, which may afterwards be reunited to the oxide without the intervention of water. The remark of M. Henry, that minium would not answer for the preparation of plasters of a good consistence, is easily explained from the following observations:—M. Chevreul regards the fatty substances as composed of oxygen, hydrogen, and carbon, in such proportions that one part of their elements represents the greasy acids, whilst the other portion, separated by water, represents the glycerine. When these bodies are submitted to the action of a salifiable base sufficiently energetic, the equilibrium of their elements is destroyed. The alkaline power determines acidity in one portion of the mass of saponifiable substances, whilst the remainder of the compound, by mixing with water, constitutes glycerine.

The acids produced unite with the oxides and form salts with a base of lead; and, as this metal only unites with the acids in the state of a protoxide, a salt with such a base is readily obtained by the union of *this* oxide with a fatty body, which constitutes *simple plaster*.

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without the use of water, steam being the source of heat, I was surprised to find, after several hours, during which time the litharge and oil had been kept at a temperature of  $220^{\circ}$ , or thereabouts, and constantly stirred, not the slightest appearance of combination: upon the addition of a small quantity of boiling water, the oil and oxide immediately saponified; water appeared, therefore, to be essential to the formation of the plaster. It also appeared probable the oxide might be in the state of hydrate; to ascertain if such were the case, I precipitated, by potash, the oxide from a quantity of acetate; the precipitate, when washed, was dried by a heat of  $220^{\circ}$  till it ceased to lose weight; one hundred grains, heated to redness in a tube, gave off nearly eight grains of water, and assumed the orange colour of litharge; the recently precipitated oxide was therefore, no doubt, a hydrate; part of which, with somewhat less than two parts of olive oil, without any addition of water, at a temperature of  $212^{\circ}$ , formed, in half an hour, perfect plaster. Each of these experiments has been repeated, with precisely the same results. I am induced to mention this fact, because all pharmaceutical writers limit the action of water to that of keeping down the temperature.—*Journ. Royal Institute, January 1826.*



*Alterations which plasters undergo by age.*—When plasters have been prepared for some length of time, they change their colour and harden. Sometimes they become friable, but more frequently this effect occurs only at the surface, which protects the interior from any change.

It has been observed that simple plaster becomes yellow at the surface, the divine plaster black, the emplastra diabolica covered with crystals\*. These alterations being the effect of the action of the atmosphere, it is necessary, as much as possible, to prevent their coming in contact with it.

Plasters, which have undergone these alterations, have lost nothing of their medicinal properties. They may be used by separating the part which has become hard; or by melting them over a gentle fire and adding oil in sufficient quantity to restore their consistence. This addition will render them suitable for use.

The following rules ought to be observed in the preparation of different kinds of plasters:—

1. To ascertain the purity of the litharge, and to reduce it to a very fine powder.
2. In preparing plasters by combination, which are not intended to be burnt, caution must be observed to have in the vessel a sufficient quantity of water, destined to serve as a bath.
3. The form of the vessel used should resemble that of one-half of an egg-shell, cut transversely.
4. To facilitate the combination between the oxide and the fatty body, continual stirring with a spatula is necessary, thus holding the metallic oxide in suspension.
5. In preparing *burnt plasters*, a slight carbonization must be effected, and the fire conducted with caution after the addition of the oxide.

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\* M. Richard Dupral has recognized the presence of nitrate of potass on the surface of this plaster. MM. Henry and Blondeau have obtained sulphur and benzoic acid. It is probable these products, dissolved in the water, are brought to the surface by means of that vehicle.



6. In *plasters by mixture* gum resins must be dissolved in vinegar or weak alcohol, and the solutions evaporated to the consistence of thick honey.

7. Resins must be reduced to powder previous to their admixture with other substances, to prevent the mixture from becoming lumpy.—Mercury must be extinguished by the aid of turpentine.—Extracts must be dissolved in water.

8. Volatile oils, camphor, and aromatic powders, to be added only towards the end of the operation.

9. Any deposit from fresh plants, if such enter into the composition, must be separated from it.

10. The plaster to be well pulled and worked with the hands, to obtain it homogeneous in all its parts.—*Dictionnaire des Drogues.* C. E.

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#### *On the Upas Antiar and Upas Tieuta.*

We are informed by M. A. Richard, in the *Journal de Chimie Medicale, de Pharmacie et de Toxocologie*, that we are indebted for the first correct accounts of the trees producing these poisons, and the modes employed by the Javanese in preparing them for use, to M. Leschenault, naturalist to the French expedition under captain Baudin, and to Dr Thomas Horsfield, naturalist and physician to the government of Holland in Java. Both of these gentlemen resided some time in the island, and the former published, on his return to Paris, an account of the trees in the *Annales du Muséum d'Histoire Naturelle*, and sent some of the poisons to MM. Magendie and Delile, who ascertained by experiment their action on the animal economy, which they made public. Dr Horsfield published his description in the

Transactions of the Society of Batavia. These are the sources from which the following facts are drawn.

The *upas antiar* is known at Java under the name of *oupas antschar*, and stated by M. Leschenault to belong to the family *urticées*, to which he gave the name of *antiaris toxicaria*.

This tree acquires colossal dimensions in the forests of that island, is surrounded by every species of vegetation, and covered by innumerable insects, which experience no inconvenience from its poisonous proximity. This does not accord with the fables of former times, that it was always found solitary, poisoning the atmosphere to a certain distance, and causing death to every living thing that approached within the sphere of its destructive influence. Its trunk produces large excrescences similar to those of the *canarium commune*. The leaves are alternate, oval, petiolate, coriaceous, of a pale green colour, and covered with short rough hairs. The flowers are *monoiques*. The male flowers are united on a common receptacle, hemispherical, pedunculated and axillary; they are separated by numerous imbricated scales.

The female flowers are solitary, and almost sessile at the axilla of the leaves; numerous imbricated scales cover the ovary, which is surmounted by two stigmata. The proper juice contained in the bark of the antiar is very viscous, and possesses a bitter taste; drawn from the trunk, it is of a yellow colour, while that furnished by the youngest branches is white. Individuals, according to their susceptibilities (as is the case with other poisons), are affected differently by its odour; to some it is prejudicial, while over others it exerts no influence. The principal locality of this tree is at the oriental extremity of Java; it is also found in the islands of Borneo, Sumatra, and Bali, where its poison is called *ipo* or *upo*. According to Dr Horsfield, the Javanese adopt the following mode for preparing the poison of the upas antiar. They collect eight ounces of the juice in the evening, and inclose it at once in a tube of bamboo; this they

afterwards put into a proper vessel, and carefully mix with it the expressed juices of the following articles, well triturated together:—*arum nampoo* of the Javanese; *kempferia galanga*, L.; *amomum zerumbet*, L.; onion and common garlic, of each half a drachm. To this they add an equal quantity of powdered black pepper, agitating the mixture, and subsequently a single grain of *capsicum fruticosum* is placed in the midst of the mass. This grain produces an immediate action, occasioning an apparent agitation on the surface of the liquor, sometimes at the sides, sometimes in the middle of the vessel, for about one minute. After this has subsided, they add the same quantity of pepper and another grain of *capsicum*, from which there results an analogous action, but less in degree, to that which took place in the first instance. A third addition of these peppers is finally made in the same proportions, and after all movement has ceased, and the surface of the mixture presents the appearance of a circle in the shape of an areola, the operation is concluded, and the poison prepared. The preparation of poisons is a particular art in Java, known only to a few obscure individuals, who inhabit the gloomy and mountainous recesses of the island. In general they preserve the *antiar* in branches of the tubular bamboo, exactly closed at each extremity, and varnished with resinous substances. When exposed to the air it rapidly decomposes, but by being thus enclosed, in sealed tubes, it preserves its original activity for a great length of time, as was ascertained by MM. Magendie and Delile, in their experiments on that which was brought from Java by the French naturalist.

*Upas tieuta*. This poison, called by the natives *tshettik*, we are told, by Dr Horsfield, is still more poisonous than the preceding, and is the product of a large branching or climbing shrub. The fructification of it is unknown, but M. Leschenault has recognized it as belonging to the genus *strychnos*, and described and figured it under the name *strychnos tieuta*. The roots of this shrub extend themselves



horizontally, sometimes to a very considerable distance, while the stem twines itself round the loftiest trees, reaching from the base to the summit. The small branches are opposite on the stem, long, twisted, cylindrical, diverging, and bearing the leaves, which are also opposite, oval, lanceolate, entire, glabrous, and acuminate.

The *tieuta* is by no means abundant, and grows in deep and shady forests.

To prepare the poison, the root is taken up and washed, deprived of its bark, and subjected to the action of water kept at the boiling point for about one hour. The liquid is then carefully filtered through linen, and again placed over the fire, where it is evaporated by gentle heat to the consistence of a soft extract. To this the expressed juices of arum, galangal, onion, garlic, &c. are added, with the pepper in powder. The mixture is to be placed over the fire for a few minutes, and the process is completed.

The Javanese employ these preparations indifferently to poison their arrows for war or for the chase. The flesh of animals thus killed contracts no deleterious properties, provided the part is immediately separated into which the arrow has sunk.

Although death follows very rapidly from the introduction of these two poisons, yet their mode of action is very different, as has been shown by Magendie and others. The *antiar* acts like all the other acrid narcotic poisons; it is absorbed, enters the circulation, operates on the brain and spinal marrow, and frequently occasions all the effects of emetic substances. The *tieuta*, on the contrary, is indebted for its powers wholly to the strychnine which it contains, and its terrible effects are produced altogether through the medium of the spinal marrow. Tetanus, paralysis of the thorax, and asphyxia succeed, and occasion the death of the animals subjected to its influence. No trace of strychnine is found in the *antiar*, and as was before observed, its action on the animal economy is milder than its associate. B. E.

*New Process for extracting the Volatile Oil of Copaiva,  
and for saponifying the Resin at the same time.*

In the Journal de Pharmacie for February 1829, M. F. E. Ader offers some remarks upon the inconveniences of the process of distillation, the only one heretofore employed for the separation of the volatile oil from the resinous fluid *copaifera officinalis*, and then proceeds to the detail of experiments which have induced him to adopt a different mode.

The objections to distillation are, that if the vessels employed are metallic they become tarnished, contract a very offensive odour, and are for a long time unfit for any other purpose. If on the other hand the apparatus be glass, although it can be readily cleansed, yet, the time, fuel and attention necessary to conduct the operation, render it expensive, especially where large quantities are subjected to decomposition.

It was by observing the effects of alkalies upon volatile oils at different temperatures, that M. Ader was led to infer the possibility of separating many of these substances from the original compounds. He acknowledges himself indebted in his first experiments to M. Planche, and while he conceives that by this mode the oil of copaiba may be prepared more promptly and more economically than by distillation, it offers a convenient mode for analyzing many resinous fluids when it is desirable to ascertain their purity, as well as for preparing the soap of the resin of copaiba.

Introduce into a matrass, of the exact size to contain the liquids, 100 parts of alcohol by weight (sp. gr. .837), 100 parts of copaiba, and agitate them well together; then add  $37\frac{1}{2}$  parts of solution of caustic soda (sp. gr. 1.333); shake them again to assist the saponification of the resin; add also 150 parts of water; agitate gently and cork the vessel; invert it several times and set it aside to rest. Immediately small globules of essential oil will be seen suspended in the liquid;



after the lapse of two or three hours, the mass becomes separated into two distinct strata. The upper, scarcely coloured and very fluid, occupying the neck of the matrass, is the volatile oil. The lower, of a yellowish amber colour, perfectly transparent, is the saponified resin, dissolved in weak alcohol. Separate the oil by means of a little pipe or syphon, and set it aside in a suitable vessel to deposit the water with which it was mixed; afterwards decant and filter it. It ought to produce  $\frac{44}{100}$  of the copaiba treated. Thus prepared, it is of a greenish hue, a little less fluid, and with less disagreeable odour than that obtained by distillation: but like that it is very limpid, of specific gravity .900 at 15 degrees centigrade; its taste slightly pungent and bitter. It is soluble in water, more soluble in alcohol, but less so than the copaiba itself.

To obtain the soap, evaporate the lower stratum in a porcelain evaporating dish to the consistence of honey. Separate the excess of alkali, by a saturated solution of hydrochlorate of soda. Decant the liquid, wash the residue, and subsequently drain off all the water. Then dissolve in alcohol, and evaporate or distil until a solid product is obtained; which will be the true saponified resin of copaiba. It has a yellow colour and is very transparent. Its odour is less than that of copaiba, but its taste is decidedly more bitter and austere. It is soluble in twelve times its weight of water, at 15 degrees centigrade, whilst three parts are sufficient at 100 degrees. Its remedial properties ought to be much more active than copaiba on account of its great solubility. It rests with the physician to appreciate its value.

This soap has some resemblance to a preparation used in London for some time, and known under the name of soluble resin of copaiba. It has been employed with success by some practitioners in cases where copaiba is prescribed.

It appears that M. Morson, who is the author of it, prepares it by the immediate union of caustic soda, with the resin of copaiba, deprived of its volatile oil by heat. A small quantity prepared by this pharmacien was sent to M. Planche.



Its colour is a reddish brown, transparent, almost entirely deprived of the smell of copaiba, though its taste is much more distinct. It is slightly soluble in water, at a temperature of 100 degrees centigrade.

The preparation appears to be nothing more than the resin of copaiba, of which a part is imperfectly saponified. The product of the above process appears in every respect preferable to it.

C. E.

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*Selections from Faraday's Chemical Manipulation.*

[Continued from page 51.]

When oxidized and foul copper, such as wires, plates, &c. are rubbed clean by sand-paper, a subtle cupreous dust is diffused through the air, which is exceedingly unpleasant in its effects upon the mouth and nostrils. It is better in such cases to use a little water with the sand-paper; the copper is more readily cleaned, and all unpleasant effects are prevented. Foul copper-plates may be cleaned also by putting them into the furnace and heating them to redness for five minutes, with access of air, so as to allow the formation of a coat of oxide upon them, and then plunging them in water. The oxide scales off, or may easily be separated by bending the plate, and leaves the latter clean and metallic.

Porcelain and other mortars should be kept in good and clean condition; dry pulverizations frequently fill the minute irregularities of the inner surfaces with the substance pulverized, so that even after careful washing, portions still remain behind. This may readily be observed with coloured bodies, as oxide of iron, Prussian blue, vegetable substances, &c. A little sand and water put into the mortar and rubbed with the pestle over all the contaminated parts, cleans them and the pestle itself so far, that the affusion of water is suf-

ficient to wash off all impurities. In some cases, sulphuric or nitric acid, or solution of alkali, must be used; their action is always facilitated by rubbing a little sharp sand in the mortar with the pestle.

Adhering dirt and dust, as well as the thin films of oxide and other impurities which attach to mercury, may be removed in several ways. A very common method is to fold a piece of paper into a cone, so as to make it nearly tight at the apex, and to pass the mercury through it as through a funnel. The aperture at the bottom may be made larger or smaller by a little management of the paper: when the inward fold is pulled upwards, it increases the aperture below, whilst pulling the outer fold upwards a little, tends to close it. The aperture may also be opened or closed more or less by applying the finger to it. The mercury as it runs through should be received in a glass or other proper vessel, and the last portions reserved in the cone; they will be found to abound with scum and other impurities; a portion of which might pass out with the metal. It is better to put these latter portions by themselves, and when they have accumulated, to purify them altogether. This method of cleansing mercury is a ready and sufficient one in numerous cases where it is only the adhering dirt that is to be removed.

Mr Millington recommends that the mercury should be cleansed from mechanical dirt by being filtered through the pores of a piece of hazel wood by means of atmospheric pressure. Others squeeze it through a piece of shamois leather. But when cleaned by any of these methods, a film still generally adheres to its surface; and the metal when agitated has a scum formed upon it, especially when chemically foul. Much assistance in removing this exterior scum and dirt is gained by pulverizing some loaf sugar, putting it into a bottle with the mercury to be cleansed, and agitating them well together. The sugar should be damped, which may be done by breathing into the bottle two or three times; by agitation it then adheres to the dirt with



the mercury, and the latter being removed by passing it through a paper funnel, is obtained in a state of great comparative cleanliness.

The *chemical impurities* of mercury consist of certain metals, such as lead, tin, zinc, &c. These interfere chemically when the metal is to be used in forming combinations; and from the rapidity with which they oxidate and produce films on the surface, interfere mechanically in its uses in the bath, in certain electro-magnetic experiments, and in the construction of thermometers and barometers. Mercury which is chemically impure will soon acquire adhesive films on its surface, even when cleansed of mechanical impurities, and with a rapidity dependent on the agitation of the metal or extension of its surface.

The first method of purifying mercury from these metals is by distillation. The operation should be performed in an iron retort, a portion of clean iron and copper filings having been introduced with the mercury, which should be condensed and received in clean water. Although this is an excellent process generally, yet it is by no means unobjectionable, for both zinc and arsenic will pass over, and these metals are not uncommonly introduced in experiments at the mercurial trough.

A very useful method of cleaning considerable quantities of trough mercury is to put from half an inch to an inch in depth into a large earthenware pan, and to pour over it sulphuric acid diluted with twice its weight of water. The surface of contact, and consequently of depuration, is thus rendered very large. The substances should be left together for a week or two at common temperatures, being frequently agitated. At the end of that time the metal and the acid are to be separated, the latter preserved for a similar operation at some future period, and the former washed, dried, and cleansed mechanically, as already described. The sulphuric acid acts more readily if a little sulphate of mercury be added to it; the residue of a process for the preparation of sulphurous acid from sulphuric acid and mercury may



be used for the purpose without farther preparation. This residue is not an uncommon one in the laboratory, and being put altogether into the pan, the mercury, the sulphuric acid, and the sulphate of mercury, will each be economically and usefully disposed of.

An acid solution of nitrate of mercury left upon the trough metal in a manner similar to that just described, will also cleanse it to a great extent from other metals. The solution need not be very strong, or in large quantity; a week or two at common temperature is sufficient for the purpose. The solution when poured off should be reserved apart from other nitrate of mercury, for this particular use; the impurities which it has received from the metal, and for which it has rendered up an equivalent portion of mercury, rendering it unfit for any other than very ordinary purposes.

These chemical cleansings of the trough mercury are intended to destroy the disposition which exists in impure mercury to form films upon its surface. The films are produced by the oxidation of a very minute portion of the impure metal; they do not consist of oxide alone, but of metallic matter adhering to it, which being enveloped by the film of oxide, is prevented from coalescing with the fluid metal beneath, and is equally injurious in its effect as if it were also extraneous matter. Whenever the surface of filmy mercury is extended or removed, the film from the neighbouring parts rapidly expands over the newly exposed portion, just as a drop of oil extends and expands itself over the surface of water. This may be observed and understood by moving a card over the surface of such mercury from one side to the other: the film will be collected on the one side of the card, and the recent surface on the other will become covered by an extension of that which is on the metal immediately in its neighbourhood. If the operation be repeated, still the renewed surface will be re-covered, and thus a large quantity of film may be collected which if examined appears to consist for the greater part of metallic mercury. And though after many operations of this

kind the surface of the metal will be much cleaner than at first, yet exposure to the air for a while, especially if aided by agitation, will soon bring the surface into its first dirty condition, and this will continue so long as the mercury contains metallic impurities.

Small quantities of mercury, as for instance a pound or two, may be purified upon particular occasions by very ready and simple processes. Dr Priestley's\* method is a most excellent one, and highly worthy of attention. So much foul mercury is to be put into a ten or twelve ounce stoppered bottle as will occupy about a fourth part of its capacity, the stopper to be put in, the bottle inverted, and being held in both hands is to be shaken violently, the hand that supports it being generally struck against the thigh. After twenty or thirty strokes the stopper is to be taken out, and the air in the phial changed for fresh air by blowing in to it with a pair of bellows. The mercury will soon become black, and a quantity of the upper part will appear as if it were coagulated, so as to be easily separable from the rest; the phial is then to be inverted, and the mouth being covered with the finger, all the metal that will flow easily is to be poured out, and the black coagulated part put into a cup by itself; by pressure with the finger this may easily be separated into running mercury and black powder, the former, with the rest of the metal, is then to be returned to the bottle and agitated as before. This process is to be repeated till no more black matter separates, and it is not a little remarkable that the operator will be at no loss to know when that is the case, because the whole of the mercury becomes pure at once; and Dr Priestley observes, that "whereas, while the lead was in the mercury, it felt, as I may say, like soft clay, the moment the lead is separated from it, it begins to rattle as it is shaken, so that any person in the room may perceive when it has been agitated enough."

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\* Experiments and Observations on Air, vol. iv. section xvi.; or abridged edition, iii. 439.



Mercury purposely rendered impure by lead and tin was found to be perfectly purified by this process.

Another method is to put the mercury to be cleaned into a bottle, to add a little nitrate of mercury or a small quantity of diluted nitric acid, to agitate well for a minute or two, then to wash off the soluble parts with any portion of yellow powder formed, and to dry the mercury with a cloth. If any difficulty should occur from the separation of the mercury into an infinity of globules, which may proceed so far at last as, with the intervening water, to give the whole a soft solid appearance, it is easily overcome by drying the mercury after it is well washed, in a Wedgewood basin by heat. As the water evaporates, the globules of mercury will run together, and the metal will be obtained in its clean and pure state.

After any of these processes, the adhering dust should be removed by passing the metal through a paper cone or funnel.

The tests of the purity and cleanliness of mercury are, the absence of all film or powder when a portion is shaken quickly for a moment in a clean tube or bottle; the freedom of its motions upon the surface when agitated; the extreme mobility of its globules when a little is poured into a clean dish and broken into small parts; the perfect rotundity of form at the receding edge when a portion is made to flow from side to side of a glass dish or other clean vessel; the largeness of the depression which exists, when it is put into a dry bottle, between the sides of the glass and the metal at the surface of the mercury; and the ready pointing of a small magnetic sewing needle when laid upon its surface out of the magnetic meridian.

When mercury has been purified and cleansed for very particular experiments, as those relating to the barometer and thermometer, extreme care is required that its surface be not soiled by any portion of dirt from the hands or the vessels used. The smallest quantity of greasy matter, or of deliquescent, or animal, or vegetable substances soluble in



water is enough to render it improper for these uses: it is rapidly diffused by motion over the whole surface of the metal, and even a touch with the finger is sufficient to communicate so much impurity as to render the mercury inapplicable in the construction of accurate instruments.

A glass should always be appointed and kept in one particular place to receive any residual portions of mercury that may be left in an impure state after experiments, or gathered from the table in a dirty condition. They are thus saved and accumulated, and when in considerable quantity may be freed from mechanical impurity by washing, and then be purified by any one of the methods described which may be most applicable. In this manner a continual saving of metal is effected to a great extent; the quantity thus returned to the trough in an active laboratory in the course of a year being very considerable.

#### *General rules for young experimenters.*

Besides the numerous directions which occur throughout the preceding pages, there are certain general precepts and rules, the observance of which will be found of great service not only to those who are commencing the practice of experimental inquiries in chemistry, but likewise to such as, having made some progress, have indulged themselves in irregular habits. They all relate to *method*, that great source of facility and readiness which is equally influential in the performance of the most common and the most difficult processes. Such as are here given have been proved by long trial: it is not supposed that they include all that are advantageous, but they are all that suggest themselves to the mind of the author as worthy to be classed together for their general usefulness. Those who may add to them will deserve the thanks of the practical chemist.

A particular and convenient part of the laboratory tables should be appointed for all general operations of experiment. It should be considered as a place intended for working only, and should not be encumbered by things carelessly laid

upon it: it should be understood that every article placed there by the experimenter is sacred for the time; that no apparently dirty glass or useless bottle is to be removed, nor any arrangement upon it disturbed by others who may be in the laboratory, but that all is to be left until the experimenter himself has disposed of them or given special directions to that purport. It is desirable in a long course of experiments that this place should be cleared as much as possible every evening, that it may be ready the next day for further progress, but unless this be done by the experimenter, or under his particular directions, it should be left untouched.

By the side of this portion of the table should be another, appointed to receive apparatus, bottles, and other articles that are done with. The putting of a thing here should be considered as a direction that it may be cleansed and restored to its proper place. The experimenter will do well to disembarass his part of the table during his pursuits by moving his dirty glasses, waste precipitates and mixtures, and every thing for which he has no further present use, to this place, that they may be taken away. It is convenient that a wooden tray should remain on the spot, which, when filled with dismissed apparatus, may be at once removed towards the sink and replaced by another.

The laboratory note book, intended to receive the account of the results of experiments, should always be at hand, as should also pen and ink. All the results worthy of record should be entered at the time the experiments are made, whilst the things themselves are under the eye, and can be re-examined if doubt or difficulty arise. The practice of delaying to note until the end of a train of experiments, or to the conclusion of the day, is a bad one, as it then becomes difficult accurately to remember the succession of events. There is a probability also that some important point which may suggest itself during the writing, cannot then be ascertained by reference to experiment, because of its occurrence to the mind at too late a period.



The account of the days' experiments should always be prefaced by noting down in the book the day, month, and year; and if the experiments relate to gaseous manipulation, the height of the barometer, and the temperature of the laboratory.

On commencing the examination of a substance of unknown nature, the experimenter should first proceed to the most general and instructive experiments, and then to those which are more particular. He should therefore apply heat to the substance contained in a tube, and remark whether it fuse or volatilize; he should then heat it in the air upon platina foil, observing whether it will burn or not, whether it will evolve fumes, &c. Afterwards it should be heated in water in a tube, and observed whether it be soluble; and then trials should be made to ascertain if it be sapid, if it be soluble in alcohol, &c. These general examinations will soon indicate to what class of bodies the substance belongs, and will point out the particular train of investigation it may require; after which the substance may be dissolved by acids or alkalies, or any other proper solvent, and its properties more minutely ascertained.

When a substance has been brought into solution, and its relation to various tests and reagents is to be considered, it will be proper to proceed methodically in examining the different substances eliminated by their action, and not to wander from one to another. The examination of the first product or educt should be completed before proceeding to that of a second, unless indeed it be expected that a particular trial of one will throw light upon the nature of another. Generally speaking it is best to pursue the precipitates, reserving the remaining solution until these are examined. Thus if an ore be dissolved in an acid, and the solution be precipitated by potassa, the precipitate should in this method be examined before the remaining solution. If this precipitate require solution in an acid, and precipitation by peculiar tests, the first precipitate it affords should be examined and decided upon, and then the solution contain-



ing the remainder resumed, and its nature made out. This done, and consequently the whole of the original precipitate dismissed, the solution which remained when it was thrown down by the potassa is to be resumed, and treated with other agents. Perhaps carbonate of ammonia may be applied, and cause a second precipitate from it which is as before to be examined previously to the solution yielding it.

On other occasions, the solutions may be investigated before the precipitates. This plan indeed may be followed generally, and possesses the advantage of supplying the experimenter with occupation in the solution whilst his precipitates are washing. The rule intended to be impressed is, that the one or the other of these plans should be adopted as a constant practice; a deviation from which is to be resorted to only when it is considered as offering peculiar advantages.

A plan of this kind renders the notes of the experiments also more methodical. The different solutions and precipitates may be referred to by letters, as is usual in describing analytical process. Thus in the instance quoted, the original solution may be called *a*; the precipitate by potassa, *b*; the remaining solution, *c*; the solution of the precipitate, *d*; the precipitate from it, *e*; and the solution with the rest of the precipitate *b*, *f*. The solution *c* being then resumed, the precipitate by carbonate of ammonia will be *g*, and the solution remaining, *h*.

When the substance to be examined is small in quantity and rare, those experiments must be first made that will not prevent the performance of others. The action of heat, of water, and of alcohol, upon a substance may be observed, and still leave it in a proper state for other experiments, as those of solution and precipitation. The same portion of water which has been tested for sulphuric acid by nitrate of baryta, may after filtration be tested for muriatic acid, by nitrate of silver; whereas if muriate of baryta had been used in the first place, the second trial would have been impossible.

New, important, and uncertain or unexpected results, are to be repeated once or twice, that no doubt may exist at a future period, as to the accuracy of the notes which have been made at the time of observation.

When a long series of experiments with the spirit-lamp is in progress, a candle or lamp continually burning should be at hand.

On examining a mineral water by precipitants, the glasses used should be placed in a row, each before the precipitant which has been added to the water it contains: and they should remain for half an hour, that any ulterior indication of the test may not be overlooked, and without risk of mistaking one glass for another.

Every substance or glass that is entirely done with, should be dismissed, and placed at once on the tray of dirty articles.

Besides the working place, another, unconnected with the busy part of the laboratory, should be appointed, from which nothing is to be removed without the experimenter's direction. There are many occasions on which experiments or solutions are to be placed aside for a week or two, to be again resumed. These should be labelled, and put into a place which, from previous appointment, is considered as containing nothing that may be disturbed. In this way the experimenter will often avoid the disagreeable circumstance, of finding that what he intended to reserve for future examination, has been dismissed to the sink or the dust-hole. A third place of this kind may be appointed in a cupboard, out of the way, for the reception of experiments that require weeks or months for their performance, or for things that cannot be resumed before long periods have elapsed.

All products, educts, precipitates, or solutions, that are set aside for some time, should be labelled, and referred to by their names or marks in the note-book. Thus the precipitates and solutions before spoken of should have labels, *a*, *b*, *c*, &c. on the glasses or bottles containing them. When the products are new and important this should be



done immediately, that no possibility of mistake from delay may be allowed to occur. The use of gummed or pasted paper removes all trouble from this operation.

Finally, the general rules for cleanliness and order so often inculcated, are to be attended to. This subject cannot be better closed than by the very excellent observations of Macquer on this subject. He says, "A persuasion must exist that arrangement, order, and cleanliness, are essentially necessary in a chemical laboratory. Every vessel and utensil ought to be well cleansed as often as it is used, and put again into its place; labels ought to be attached to all the substances, mixtures, and products of operations which are preserved in bottles or otherwise; these should be examined and cleansed from time to time, and the labels renewed when required. These cares, although they seem to be trifling, are notwithstanding the most fatiguing and tedious, but the most important and often the least observed. When a person is keenly engaged, experiments succeed each other quickly; some seem nearly to decide the matter, and others suggest new ideas; he cannot but proceed to them immediately, and he is led from one to another; he thinks he shall easily know again the products of his first experiments, and therefore he does not take time to put them in order; he prosecutes with eagerness the experiments which he has last thought of, and in the mean time the vessels employed, the glasses and bottles filled, so accumulate that he cannot any longer distinguish them; or at least he is uncertain concerning many of his former products. This evil is increased, if a new series of operations succeed, and occupy all the laboratory; or if he be obliged to quit the place for some time, every thing then goes into confusion. Hence it frequently happens that he loses the fruits of much labour, and that he must throw away almost all the products of his experiments.

"The only method of avoiding these inconveniences is to employ the cares and attentions above mentioned. It is indeed unpleasant and very difficult continually to stop in the



midst of the most interesting researches, and to employ much valuable time in cleaning and arranging vessels and attaching labels. These employments are capable of cooling and retarding the progress of genius, and are tedious and disgusting: but they are nevertheless necessary. Those persons whose fortunes enable them to have an assistant operator, on whose accuracy and intelligence they can depend, avoid many of these disagreeable circumstances; but they ought nevertheless to attend to the execution of these things. We cannot depend too much on ourselves in these matters, however minute, on account of their consequences. This becomes even indispensable when the experiments are to be kept secret, at least for a time, which is very common and often necessary in chemistry.

“When new researches and inquiries are made, the mixtures, results, and products of all the operations ought to be kept a long time well ticketed and noted. It frequently happens that at the end of some time these things present very singular phenomena, which would never have been suspected. There are many beautiful discoveries in chemistry which were made in this manner, and certainly a much greater number which have been lost because the products have been thrown away too hastily, or because they could not be recognized after the changes which happened to them\*.”

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\* Dictionnaire de Chimie, par Macquer, ii. 486.

Table of the Quantity of Volatile Oils yielded by different Plants.—By C. Recluz, Pharmacien of Paris.

| PLANT.                  | PART USED.                   | QUANTITY OF VOLATILE OIL OBTAINED FROM 25 POUNDS.  | COLOUR.                             | OBSERVATIONS.   |
|-------------------------|------------------------------|--|-------------------------------------|---|
| Amygd. com. var. amar.  | Dried seeds                  | 6 drs. 34 grs. (Itner.)  | Golden yellow                       | Liquid, crystallizable, heavy, bitter, containing Prussic acid, becomes brown or violet coloured with age.      |
| Pimpinella anisum       | Fresh seeds<br>Dry seeds     | 8½ oz. to 9 oz. 7½ drs.<br>12 oz. 4 drs.   | Yellowish<br>Yellowish              | Composed of $\frac{3}{4}$ of a liquid and $\frac{1}{4}$ of a concrete oil.                                      |
| Citrus bergamia         | Fresh skins of<br>702 fruits | 5 oz. 3 drs.   | Citrine colour                      | Very fluid, deposits albumen in growing old, and becomes yellow (expressed).                                    |
| Anthemis nobilis        | Fresh flowers                | 1 oz. 4½ drs.  | Sapphire                            | Becomes yellow with age.  |
| Laurus cassia           | Fresh flowers                | 4 drs. to 5 drs. 45 grs.   | Blue                                |   |
| Laurus cinnamomum       | The bark<br>The bark         | 5 drs.<br>6¼ oz. to 7 oz. 7 drs. (Cartheuser.)   | Golden yellow<br>Golden yellow      |   |
| Carum carvi             | Fresh seeds                  | 7 oz. 6½ drs. (Newman.)<br>1 lb. 2 oz. 6 drs.  | Golden yellow<br>Pale yellowish     |   |
| Citrus medica           | Fresh skins of<br>630 fruits | 12½ oz. to 1 lb. 4 oz. 6 drs.<br>4½ oz. (by distillation.)   | Pale yellowish<br>Citrine           |   |
| Piper cubeba            | Seeds                        | 5 oz. 5 drs. (expressed.)  | Greenish yellow                     | Is composed of two oils, of which one is very fluid, and the other, in smaller quantity, is thick and greenish. |
| Anethum feniculum       | Seeds                        | 4 oz. 2 drs. (Baume.)  | Colourless or greenish              |   |
| var. dulce              | Seeds                        | 8 oz. 2 drs. 48 grs. to 10 oz.<br>2 oz. 3 drs. 18 grs.   | Colourless or citrine               |   |
| Caryophyllus aromaticus | Dried florets                | 3 lb. 14½ oz. (F. Hoffman.)<br>4 lb. 8 oz. (Tromsdorff.)<br>5 lb. 6 oz. (Osterm.)<br>3 lb. 6 oz. 2 drs. (Vauquelin.) | Colourless or citrine<br>Colourless |   |





Table of Volatile Oils, by C. Rectuz, continued.

|                       |                       |   |                 |  |
|-----------------------|-----------------------|---|-----------------|--|
| Ruta graveolens       | Whole pl. fresh       | 1 oz. 2 dr.   | Amber or green  | Crystallizes below 54° F.; composed of two oils, one liquid, the other concrete, both lighter than water. Contains much camphor; heavy, fluid, of an acid, burning, slightly bitter taste; very soluble in water, changes with age into a white substance, which floats on water. The heaviest of the known volatile oils. |
| Acorus calamus        | Fresh root            | 3 drs. 14 grs.  | Citrine         |  |
| Rosa centifolia       | Dried root            | 3 oz. 1 dr. to 5 oz. 1 dr. 40 grs.  | White or yellow |  |
|                       | Fresh flowers         | 62½ grs. (Hoffman.)<br>1 dr. (Tachenius.)<br>2 drs. (Humbert.)  |                 |  |
| Crocus sativus        | Dried stigmata        | 4 oz. 5½ drs. (Newman.)<br>2 lbs. 8 oz. (Henry.)  | Golden yellow   |  |
| Laurus sassafras      | Dried root            | 3 oz. 1 dr. (Hoffman.)<br>5 oz. (Newman.)<br>8 oz. 2 drs. 40 grs. (Cartheuser.)<br>4 drs. 49 grs. to 5 drs. 40 grs. | Limpid          |  |
| Salvia officinalis    | Fresh plant in flower |   | Greenish yellow |  |
| Juniperus sabina      | Dried leaves          | 4 lbs. 11 oz. (F. Hoffman.)   | Citrine         |  |
| Tanacetum vulgare     | Fresh leaves          | 2 oz. 1 dr. 48 grs. to 6 oz. 3 drs. 67 grs.   | Reddish         |  |
|                       | Dried plant in flower | 1 oz. (C. Rectuz.)  |                 |  |
| Thymus vulgaris       | Dried plant in flower | 4 oz. 5½ drs.   | Golden yellow   |  |
| Valeriana officinalis | Dried roots           | 7 drs.  | Pale greenish   |  |
| Wintera aromatica     | Dried bark            | 1 oz. 20 grs.   | Citrine         | Very fluid, becomes viscous in the air, perhaps converted into oxalic acid. (Promsdorff)<br>Liquid, and lighter than water; by long standing separates into two parts, one sebacious, white, heavier than water, the other citrine, fluid, lighter than water.   |

The above weights are French. The pound contains 16 oz.; the ounce, 8 drs.; the drachm, 72 grs.

*Remarks on the Native Oil of Laurel.—By Thomas Hancock, M.D. Fellow of the Medico-Botanical Society.—Addressed to the President and Fellows.*

Gentlemen,

As you have done me the honour of electing me one of your body, I beg to draw your attention to a very extraordinary vegetable production, the knowledge of which has hitherto been almost exclusively confined to the natives of Spanish Guiana.

This substance, which has been very injudiciously termed “Azeyte de sassafras” (an appellation which tends to confound it with the essential oil yielded by the *laurus sassafras* of the northern continent of America), affords, so far as my knowledge extends, an extraordinary and solitary instance of the production of a perfectly volatile liquid, without the aid of art. Substituting for the appellation to which I have objected the provisional name of “native oil of laurel,” I shall describe the method of procuring it, and enumerate its principal chemical and medicinal properties, so far as they have been investigated and examined.

The native oil is yielded by a tree of considerable magnitude; its wood is aromatic, compact in its texture, and of a brownish colour, and its roots abound with essential oil.

This tree, which is found in the vast forests which cover the flat and fertile regions between the Orinoco and the Parime, has, from an analogy already alluded to, been supposed to belong to the natural order Laurinæ; and though Humboldt and Bonpland do not seem to have been acquainted with its singular and important produce, its botanical characters may very possibly have been described in their *Plantæ Equinoctiales*, under the genera *Ocotea Persica*, or *Litsæa*. This question, however, I am unable to solve, as I have never seen the parts of fructification.\*

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\* It has, since the above was written, been supposed to be the produce of the



The native oil of laurel is procured by striking with an axe the proper vessel in the internal layers of the bark, while a calabash is held to receive the fluid. So obscure, however, are the indications of these reservoirs, that the Indians (with perhaps a little of their usual exaggeration) assert, that a person unacquainted with the art may hew down a hundred trees without obtaining a drop of the precious fluid. In many of its properties the "native oil" resembles the essential oils obtained by distillation and other artificial processes; it is, however, more volatile and highly rectified than any of them, its specific gravity hardly exceeding that of alcohol; when pure, it is colourless and transparent, its taste is warm and pungent, its odour aromatic, and closely allied to that of the oily and resinous juice of the *coniferae*; so striking is this resemblance, that a friend to whose inspection I submitted the oil, pronounced it, rather hastily, to be "spirit of turpentine." It is volatile, and evaporates without a residuum at the atmospheric temperature. It is inflammable, burning entirely away, and except when mixed with alcohol, gives out in its combustion a dense smoke. Neither the alkalies nor acids seem to exert any sensible action on the "native oil." Upon dropping into it sulphuric acid, the latter assumes a momentary brownish tinge, but soon resumes its transparency, remaining at the bottom of the vessel. The oil of laurel dissolves camphor, caoutchouc, wax and resins, and readily combines with the volatile and fixed oils. It is insoluble in water, soluble in alcohol and ether. Though the specific gravity of the oil exceeds that of ether, yet the compound, formed by combining them in the proportion of one part of the former to two of the latter, floats upon the surface of pure ether, and may therefore be the lightest of all known liquids.

With respect to the medicinal properties of the "native oil," it bears, when externally applied, the character of a



powerful discutient, and appears, when exhibited internally, to be a diaphoretic, diuretic, and resolvent; by many it is believed to be analeptic, alterative, anodyne, and to promote the exfoliation of carious bones. Without listening to the extravagant reports of the Indians, who exalt it into a panacea, we must admit that its efficacy has been demonstrated in cases of rheumatism, swellings of the joints, cold tumours, pains in the limbs, and in various disorders supposed to originate in a vitiated state of the blood. In all these cases it is exhibited in doses of from 20 to 40 drops on sugar, twice a day, accompanied by frequent and long continued friction of the parts affected with the oil, while the body is kept moderately warm, and a free use of diluting drinks prescribed to the patient. The same practice is said to have been attended with the happiest effect in paralytic disorders; for this I cannot vouch, but have found it a valuable remedy in cases of nervous headaches, sprains and bruises. A decoction of the root has been employed as an alterative in various chronic complaints, and with much success.

I am fully aware of the reaction that often results from over excited and disappointed expectation, and of the discredit into which a new remedy frequently falls in consequence of the unmerited encomiums which those who bring it into notice have injudiciously bestowed upon its virtues.

Quicquid excessit modum  
Pendet instabile loco.

However slight the credibility we may feel inclined to attach to the evidence of the Indians, upon which our knowledge of the medicinal properties of the "native oil" almost entirely reposes, the information derived from experience surely claims that attention, and justly challenges that examination which we should not hesitate to bestow on the speculations of the mere theorist. Let inquiries be instituted and experiments be made by those who, by situation and scientific attainments, are qualified for the task. By these investigations it may not only

be ascertained what degree of confidence ought to be reposed in the unqualified encomiums which the Indians lavish upon the anomalous production, but properties unknown to them may be discovered, and its history, which they have been accused (perhaps unjustly) of involving in obscurity, be satisfactorily elucidated. To the chemist and vegetable physiologist in particular the "native oil of laurel," elaborated by the unassisted hand of nature, in a state of purity which the operose processes of art may equal, but cannot surpass, presents an interesting subject of inquiry, and a wide field of speculation.—*Journ. Morb. Anat., Opth. Med. & Pharm. Anal.*

*Demerara, Feb. 20, 1826.*

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*Table of the Loss Experienced in the Pulverization of 100 parts of various Drugs.*

|                 |      |           |
|-----------------|------|-----------|
| Ipecacuanha     | 13   | per cent. |
| Jalap           | 8    |           |
| Rhubarb         | 6.2  |           |
| Squills         | 12.5 |           |
| Cinchona        | 6.3  |           |
| Gum Arabic      | 6.5  |           |
| Scammony        | 5    |           |
| Cantharides     | 7.3  |           |
| Sal ammoniac    | 2    |           |
| Cream of tartar | 3    |           |
| Antimony        | 3    |           |
| Gum tragacanth  | 6.4  |           |
| Cinnamon        | 6.4  |           |

*Dictionnaire des Drogues.*

*On Rhubarb.*

Few medicinal plants have attracted a greater share of attention than the one named above. Travellers have been sent at royal expense to explore the countries of Asiatic Tartary, in which it was said to be indigenous, for the purpose of discovering its actual locality, and procuring some of the genuine seeds. These attempts have generally proved unsuccessful, owing to the vigilance of those Tartarean merchants who monopolize the trade in this article. Seeds were, however, sent from India to England, and the cultivation commenced at one time with so much zeal and apparent success as to hold out the prospect that the home production would supply the home demand. These views have not been realized, owing either to an actual deterioration of the plant in a climate and soil not natural to it, or to the influence of prejudice in favour of an exotic medicine. We have little, perhaps nothing, new to offer upon this interesting subject. But having met with an article in the *Dictionnaire des Drogues* giving a distinct account of the different species of this plant believed or known to exist, we thought it might furnish an essay not unacceptable to many of our readers, especially the junior members of the profession. Their improvement is an important object in the publication of this journal, and they cannot be too familiar with every thing relating to the leading articles of the *materia medica*.

Under the name of rhubarb is designated the root of different plants belonging to the genus *rheum*, which form part of the family of *polygoniæ* and *enneandria trygynia*. The commercial varieties are distinguished by the names of the countries from which they are imported. Thus we have Russian and Chinese rhubarb, to which may be added the *rhapontic*, a product also of oriental climates, and formerly much employed in medicine.



We shall proceed to notice these three in detail, to which will be added some remarks on the species at present cultivated in France.

RHUBARB OF RUSSIA OR BUKHARIA. *Rhabarbarum. Rheum verum seu Rossicum, Offic.*—This variety is found in pieces slightly flattened, irregular, and sometimes angular, from one to two inches thick, and pierced with long holes. These are peeled, and present externally a lively yellow colour; while internally they are marbled red, white, and yellow, very irregular, and sometimes disposed in a stellated form. In general it is less compact than the Chinese, which renders it more difficult to cut, and causes it to yield under the knife like a spongy body. Its odour is well developed, its taste bitter and astringent, and to the saliva it imparts a deep saffron yellow colour.

This, the most highly esteemed of the rhubarbs, is the product of the *palmatum, undulatum et compactum*, plants which are indigenous to Tartary, the Asiatic provinces of Russia, and extending almost to the confines of China.

Much has been written to prove that it was to one species more than another we are indebted for this article; but there is ground for believing that it is furnished equally by all three, and derived second hand from Russia by all the rest of Europe.

RHUBARB OF CHINA. *Rheum Sinense, Tartaricum seu Turcicum, Offic.*—We are presented with this article in round or cylindrical pieces, frequently pierced with small holes, through which has been passed a cord to suspend it during desiccation. The exterior is of a dirty yellow, the texture compact, marbled with hard veins, which are of a dull brick-dust colour; the odour is well developed, and the taste bitter.

The rhubarb of China colours the saliva of an orange yellow, and crackles under the teeth. It is heavier than the Russian variety, and the colour of its powder approaches the tinge it imparts to saliva. Although less esteemed than the preceding, it possesses, nevertheless, very active proper-

ties. In commerce we find the pieces peeled like the Russian, but they are readily distinguished by their greater compactness of texture, the small holes which penetrate them, and especially by the colour, which is more obscure or greyish.

The rhubarb of China or of India comes to us directly from Canton by sea. It is probably to this long voyage, and the humidity which is the consequence of it, that we are to attribute its greater liability to worms and mould, as well as the dullness of its colour. For a long time its true origin was unknown, and it was conjectured that it was furnished by some varieties of the plant which afforded the rhubarb of Russia. Dr Wallich, superintendent of the botanical garden of Calcutta, having at length procured some seeds of the Chinese rhubarb, collected on the spots where it grew spontaneously, raised plants from them, to which he gave the name of *emodi*, the same by which the natives designate it. By Colebrooke it is referred to the *rheum australe*.

**RHUBARB RHAPONTIC.** *Rhaponticum*, *Offic.*—Two varieties of this are found in commerce, the one indigenous, the other exotic. The plant which furnishes the first, grows with facility in the climate of Paris, and the pieces are greater or smaller than the first, of a ligneous appearance, and externally of a grey reddish colour. Its transverse fracture presents a marbled surface, composed of hard striæ of a red and white colour, radiating from the centre to the circumference. It tinges the saliva yellow, but is not gritty under the teeth; possesses a mucilaginous, very astringent taste, and has a more disagreeable odour than the true rhubarb. Its powder has a shade of red which does not belong to the other varieties.

The exotic rhapontic is met with in pieces from three to four inches in length, and from two to three in thickness. Its appearance is less ligneous, and externally it is of a pale yellow, with less of the reddish hue than the cultivated va-



riety. The fracture presents the same radiated surface, and it is marked by the same physical properties which distinguish these from the true rhubarb, such as a peculiar odour, and especially a mucilaginous astringent taste, not sandy. The *rheum Rhaponticum* of Linnæus grows spontaneously in ancient Thrace, on the borders of the Caspian sea, between the Volga and the Uralian mountains, and in Siberia. This was the rhubarb of the Greeks, and when it enjoyed a distinguished reputation as a medicine, the *rumex Alpinus* was sometimes substituted for it: the latter still bears the vulgar name of *rhubarb of the monks*, and *rhapontic of the mountain*. The root of the great centaury (*centaurea centaurium*, L.) was named *Rhapontic. nostras*, because it was regarded as a succedaneum for the exotic Rhapontic. It may be easily distinguished by its sweetish taste and odour, resembling burdock.

RHUBARB OF EUROPE OR OF FRANCE. *Radices rhei nostratis*, *Offic.*—This generally presents itself in the form of large pieces, longer than they are thick, having a more ligneous texture than the preceding kinds, and marbled with very hard veins. Its odour is disagreeable and nauseous, taste astringent, scarcely gritty under the teeth, and slightly tinging the saliva yellow. The powder has a higher shade of red than belongs to the exotic rhubarbs. Of this kind there is but a single commercial variety, although produced from different species of the *rheum* successfully cultivated in several parts of Europe. All the species of the genus *rheum* are perennial, and bear vigorous stems. Their leaves, situated at the inferior part of the stem, are exceedingly large, petiolated, and sheathed, sometimes undulated, sometimes palmated, lobed or simply dentated. The flowers are numerous, grouped in long and branching panicles to the extremity of the stalk.

The *rheum palmatum* of L., which is believed in the wild state to be the species producing the best rhubarb, is distinguished from its congeners by its palmated leaves, which



are divided down to the middle into seven acute lobes. The recent roots are large, divided into thick ramifications, brittle, interiorly yellow, and covered with a brown bark.

The *rheum undulatum* of L. has waved leaves, almost covered with hairs, and having at the base on each side a very large sinus. The recent roots are large, round, divided into branches which bury themselves deeply in the soil; interiorly they are of a bright yellow, externally covered with a brown bark.

The *rheum compactum* has leaves almost lobed, denticulated, very obtuse, glabrous and shining. The roots are large, divided into numerous, long ramifications, with a beautiful reddish yellow colour within. This species appears to us to approach the *rheum australe* of Colebrooke; and of latter times the true rhubarb of China has been attributed to it. Its essential character is round and dentated leaves.

The *rheum rhaponticum* shoots out from its root, very large heart-shaped shining leaves, of a deep green colour, supported on long furrowed footstalks. The roots are large, fleshy, frequently branching, variegated internally with yellow and red, and invested with a yellow covering, slightly shaded red.

Our knowledge respecting the culture of rhubarb in its native climate, is far from being accurate or extensive, having been derived principally from the Bukharian merchants, who transport it to the entrepot established by the Russians. According to the accounts of these merchants, who contradict themselves in many points, the plant grows at the base of a chain of mountains; while other travellers assure us that it is on the summit of the highest mountains, in the neighbourhood of eternal snows, in soils of different kinds; all agree, however, that light and sandy soils are the most congenial. The roots are collected twice in the year, autumn and spring, and those only are selected which have attained the age of six years. As soon as they are drawn from the ground, they are deprived of their bark, cut into pieces, and suspended on strings, in order to facilitate their drying,

in places well ventilated, but protected from the rays of the sun. The desiccation is the most important operation, for upon this, in great measure, depend the qualities of the rhubarb; and by this process it loses about four-fifths of its original weight. A second operation succeeds to this, which is properly called the preparation of the rhubarb, and consists in cleansing the roots afresh, dividing them into smaller pieces, and piercing them, not merely with the view to suspend them in the air, but to ascertain that internally they are not damaged.

It is in this state that rhubarb is thrown into market by a company of Bukharian merchants, who have received from the Chinese government the monopoly of its trade. This company resides at Sining-Fu, about 20 days journey from Kian-Sin and Schan-Sin, cities in the west of the vast territory of Kansu. The merchants provide themselves with rhubarb in these cities, and from Sining-Fu it is exported, on the one side into China, and on the other into Russia through Kiatcha.

In Canton it is purchased directly from the agents of this company by the English, and other commercial people of Europe, and it is proverbial that the article is not selected with the greatest attention to quality at this place. On the contrary, the greatest care is bestowed upon that which is forwarded to Russia through Kiatcha. Here resides an apothecary, authorized by government to examine with the most scrupulous accuracy all the pieces, and to reject, and subject to the flames all that are defective. It is to this severity on the part of the Russians in the choice of their rhubarb, that it owes its reputation for superiority over the other kinds. The Bukharian merchants are bound to deliver by contract at Kiatcha 1000 pounds annually; but owing to the cutting, and selection it there undergoes, it is seldom that the quantity sent forward into the Russian markets exceeds 5 or 600 pounds of genuine rhubarb.

The Russians have, by every imaginable means, solicited these merchants to furnish them with the true rhubarb plant;



but their good sense dictated the refusal of all these seducing offers, as they readily perceived they would thus annihilate a lucrative branch of commerce, which enabled them to levy a sort of annual tribute upon the Muscovite empire. But if we reflect a moment on the powerful influence which soil and climate exercise over the qualities of vegetable productions, we shall be satisfied that it is almost as important to be acquainted with facts respecting these points, as to possess the plant that is, or may be regarded as the source of the best rhubarb of commerce. Yet were we even in possession of all the necessary information on this head, should we be able to imitate the process of nature? That is the great problem in the cultivation of rhubarb. We do not believe that this difficulty can be completely surmounted, any more than good wine of Burgundy or Bordeaux, can be made in any other than these localities, although the genuine vine may be procured from these celebrated vineyards. Nevertheless it is by conforming as much as possible to the circumstances of climate, after we have learned the geographical distribution of the different species of rhubarb, as well as the nature and exposure of the soil they prefer, that the European cultivator can hope to obtain an indigenous medicine, that shall rival the exotic in its general properties. Already the culture of this article has been much improved in England, France, Belgium, Germany, and even Sweden. We shall confine our remarks to the efforts made for its introduction into France.

The first essays were made at Grosbois and Claye near Paris, on the *rheum palmatum*. It is to be regretted that this species, which appears to be the type of the true rhubarb, should have deteriorated to such a point, that they have declined the culture of it, and prefer to it the *undulatum*. It has been correctly remarked, however, by M. Guibourt, that the cultivated root of the *rheum palmatum*, especially when it is old, although having the compactness of a substance which had been saturated with water before



drying, approaches very nearly in its physical and chemical properties to the rhubarb of China.

M. Genthon, pharmacien à Lorient, successfully cultivates the different species of rhubarb, and has formed in the department of Morbihan, an establishment named *Rheumpole*, which furnishes annually about 1500 pounds of indigenous rhubarb.

He sows the seed in the spring in a light soil, transplants the young sprouts the same season in the following year, and places them at the distance of about 3 feet from each other.

The roots are not taken up before the autumn of the 5th or 6th year, when they are found to weigh from 15 pounds to 25 pounds, are more spongy than fibrous, and are difficult to dry in consequence of the large quantity of mucilaginous and extractive matter they contain.

After the roots are drawn from the ground, they are washed in a large quantity of water, and those of the smallest size, and the radical fibres separated. They are then plunged into fresh water a second time, cut into pieces of convenient size, deprived of their brown bark by rasping, and to conclude the cleansing process are suffered to soak in cold water for three or four hours. They are then placed on a hurdle to drain, during which time they exude a gummy, gelatiniforme matter, and finally are permitted to dry in a stove heated from 120° to 140° centigrade. The rhubarb by drying loses from 70 to 72 per cent. of its weight. The wrinkles on the surfaces of the pieces are smoothed down by a rasp, and they are then placed in a barrel suspended on an axle, and subjected to a rotatory motion for half an hour. By their mutual friction a fine powder is disengaged, which covers, and gives to them the sensible properties of good exotic rhubarb. Some chemical differences have however been remarked, which have diminished it in the estimation of practitioners, and which we shall notice in the following pages.

The first chemists who made a regular analysis of rhubarb, confined themselves to detecting the existence of the gum-

my, resinous and colouring principles. The celebrated Scheele, and Model of St Petersburg, stated that the property so striking in the rhubarbs of India and Russia, of crackling under the teeth, depended on the oxalate of lime which they contained in abundance, but which was almost entirely absent in the indigenous variety. They also remarked that the Russian contained less of it than the Chinese. The more recent analyses of modern chemists, have displayed the existence of some more vegetable principles. M. Henry, Sen. chief of the central pharmacy of the hospitals of Paris, has separated a yellow colouring matter of a particular nature. It is volatile in the fire and gives off yellow odorous fumes, having the smell and taste of rhubarb. The alkalis brighten and redden this substance, the acids and metallic solutions precipitate it yellow, the sulphate of iron green, and with nitric acid it forms tannin. It is the *caphopicrite* of many chemists. M. Caventou obtained another colouring principle, to which he gave the name of *rhabarbarin*, but which must not be confounded with one of a similar name *rhabarbarine*, discovered a long time since by Pfaff. The latter is deep brown, opaque, and possessing properties which indicate it to be composed of several principles; and it is highly probable that it is identical with the caphopicrite of M. Henry.

The rhabarbarin of M. Caventou is yellow, susceptible of crystallization, insoluble in cold, but soluble in hot water, alcohol and ether, and endowed with a strong odour of rhubarb, and a rough, bitter taste. With all the acids it forms insoluble compounds.

Some chemists, and particularly M. Nani, an Italian pharmacien, announced the discovery of a vegetable alkali in rhubarb, with which they had formed a sulphate; but M. Caventou has ascertained that this pretended sulphate of rhabarbarin, was nothing more than sulphate of lime, tinged with the extractive matters of the root. Of the *rheumatic acid* of Henderson we say nothing, as M. Laissaigne has identified it with the oxalic.



The odour of rhubarb appears to be due to a very diffusible volatile principle, partaking of the nature of volatile oils; although it has not yet been separated in a state of purity. M. Bressy, physician at Arpajon, stated in a memoir addressed to the Academy of Medicine, that he had procured an appreciable quantity of this oil; but the commissioners of the academy were unable to collect any of it, although they repeated the process of M. Bressy in all its details.

M. Henry has published the following results of an analysis of Chinese rhubarb: 1. A particular kind of yellow colouring matter. 2. A sweet oil, becoming rancid by heat, soluble in alcohol and ether. 3. Amylaceous fecula. 4. Gum. 5. Tannin. 6. Ligneous matter. 7. Oxalate of lime (forming one-third of its weight as before stated by Scheele). 8. Super-malate of lime, sulphate of lime, and a salt with a base of potash and oxide of iron. (These last ingredients in very small quantities.)

Another analysis published by Brande (Thomson's Ann. XVII. p. 469) contains the remarkable statement that oxalate of lime is not found in rhubarb. Nevertheless the existence of this salt in the exotic varieties is so uniform that it serves to distinguish them from those of European culture, which do not contain it at all, or at any rate but in extremely small quantities, not exceeding one-tenth.

On the other hand, the cultivated are richer in tannin, and are consequently more astringent than the foreign rhubarbs. Possessing at the same time a much greater abundance of amylaceous fecula, and colouring materials, they present a redder appearance. It is therefore necessary to give twice or three times the quantity in order to produce the effect of an ordinary dose of the Russian or Chinese varieties.

Finally, M. Peretti, of Rome, gives the following results from a new analysis of rhubarb:—1. Tannin; 2. Gallic acid; 3. Malate of lime; 4. Gum; 5. Sugar; 6. Fixed oil; 7. Volatile oil; 8. Resin; 9. A yellow solid colouring substance; 10. Oxalate of lime; 11. Ligneous fibre. According to the



experience of Dr Tagliabo the resin is the most active part of rhubarb; and taken in the dose of 10 or 12 grains, it purges strongly without pain (Journal Romain, 1826). It is well known that the oxalate of lime, an inert and insoluble salt, exercises no influence over the active qualities of rhubarb; the latter are entirely due to principles soluble in alcohol and water. The following may be stated as the proportions of soluble materials in 100 parts of different varieties of this root:—Chinese, 74; indigenous from the *rheum palmatum*, 64; indigenous from the *rheum compactum*, 50; indigenous from the *rheum undulatum*, 32; indigenous from the *rheum rhaponticum*, 30.

Fifty grammes of rhubarb furnished the following quantities of watery extract:—Chinese, 22 grammes; Russian, 15.45 gram.; French, 16.857 gram. The same quantity of rhubarb, treated with rectified alcohol, furnished the following relative proportions of extract:—Chinese, 8 grammes; Russian, 8.50 gram.; European, 9.70 gram. Rhubarb is a medicine having two distinct modes of action; in small doses (of four or eight grains) its effects are tonic, confined to the stomach, and augmenting the digestive powers. To answer this purpose it should be taken a short time before meals in any agreeable vehicle. In larger doses it acts as a purgative, still, however, giving evidence of that tonic property which essentially belongs to it.

In the shops are prepared a simple and compound syrup, (compound syrup of endive) an alcoholic tincture, a wine, an extract, lozenges, &c. It enters into a crowd of officinal preparations, such as the elixirs of Stoughton, of long life, double catholicon, &c. &c.

We have stated that the exotic rhubarb, particularly the Chinese, was liable to injury from the voyage by sea. It is also subject to the depredation of worms; which the vendors conceal by stopping the holes with a paste made with powdered rhubarb and gum water; or sometimes with yellow ochre, and then rolling the dry pieces in the pulverized root;

these frauds are easily detected by rubbing off the dust which adheres to their surfaces.

Rhubarb has also been used as a colouring material; and for these purposes the European varieties might be advantageously employed, as they abound with the necessary ingredients.

The leaves, or more properly the footstalks of the leaves, especially those of the *rheum ribes*, L. a species originally from Persia, are frequently employed in England as an article of food. Their acid taste resembles considerably that of currants or gooseberries. The name of rhubarb has been applied to roots which have only a very slight resemblance in form and properties to the genuine article. Thus:

*Rhubarb of the Alps and of the monks* is the roots of the *rumex alpinus*.

*Rhubarb of the beggars, or false rhubarb*, is the root of the *thalictrum flavum*, a plant of the family of the ranunculi, very common in the humid parts of Europe, and possessing a juice sharp, bitter, and of a yellow colour.

*Rhubarb of the peasants*, or black alder. B. E.

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### Chinese Materia Medica.

The Chinese may be considered as one of the most singular people on the face of the earth. Having advanced from barbarism to a very considerable degree of civilization and refinement, they suddenly stopped short in the career of improvement, and now present the anomalous spectacle of a nation stationary in the arts and sciences. In the medicine of such a people we might expect to find, by careful investigation, some very correct views of practice, linked with the most childish prejudices and puerile conceits.

In a paper communicated by John Reeves, Esq. F.R.S. to



the Medico-Botanical Society of London, giving some account of the articles of the materia medica employed by the Chinese, we notice a few which are familiar to us: such as *Datura stramonium*; *Ficus*, or fig; *Plantago* or plantain; *Ricinus communis*, young shoots, unripe capsules, and also the ripe seeds; young shoots of two or three species of *Croton*; *Croton tiglium*; seeds which have been long known among the Chinese as a drastic purgative; some species of *Euphorbia*, and *Taraxacum*. These, with several others which appear to be peculiar to China, are much employed by the itinerant doctors, for the diseases of the poorer classes of people. Many of these they pound into pulpy masses, and apply poultice-like to wounds, bruises, swellings and sprains.

The poorer classes depend upon herbalists for their supply, while the more opulent resort to the druggists; and the consumption of drugs in that country is said to be immense, for they are almost as fond of them as they are of food. These people, though sufficiently careful in the expenditure of their money on ordinary occasions, lavish it freely on a few articles of fictitious value.

Among these may be reckoned *deers' horns* brought down in the velvet state from Tartary, and which are sold at from 60 to 80, and even 100 dollars per pair; they are usually sliced thin, and boiled in soup, as a strengthening and restorative medicine. The horns possessing these virtues are procured from one particular species of deer only.

Birds' nests (of the *hirundo esculenta*), though more properly speaking an article of luxury than of medicine, are held in high estimation by the Chinese as a tonic and restorative. They are uniformly kept at the druggists' shops, and two or three persons are constantly employed in picking off the adhering feathers, and cleansing them from any other discoloration. When thus cleansed their estimated value is about twice their weight in silver, and they form the first dish at every Chinese dinner of respectability.

Opium, too, may perhaps with more propriety be considered a luxury than a medicine; for though publicly prohibited



by government, it is very generally smoked, and by the officers of government no less than others.

The consumption is so great that it annually drains the country of eight millions of dollars.

The prejudices of the Chinese in favour of particular medicinal substances, and against others of an equal if not superior quality and of a kindred character, appear to be neither the result of reason nor experience. Their reverence for antiquity and the established customs of their country, has grown into such an inveterate habit of the mind, that it now forms a part of their mental constitution, and offers a most effectual barrier to that improvement which would proceed unaided, if freed from such trammels. Thus in the article of cassia: of which vast quantities are annually brought from the province of Kuang-Se (whose principal city derives its name from the forests of cassia surrounding it) to Canton, and thence shipped to Europe, at about 24 dollars for 133 1-3 pounds; while they themselves use a much thicker bark, (unfit for the European market), and which sells as high as 200 dollars per pecul, or 3 dollars per pound. Some choice pieces have occasionally been sold as high as 100 dollars per catty or 1 1-3 pound.

Camphor is another article in which, let its source be what it may, if perfectly purified, there can be very little if any difference. With this substance the market of Canton is largely supplied from the island of Formosa, and foreigners supply themselves with it at 34 dollars per pecul: while the Chinese will only employ that which is brought from Sumatra, called Malay camphor, and will pay for it as many dollars per catty, or 100 times as much as they dispose of their own for in commerce. It has indeed been sold for 4000 dollars per pecul.

European physicians who have used them both have been unable to distinguish any difference in their medicinal properties. The finest specimens of English camphor have been taken to Canton, but the Chinese doctors will at once recognise their own, and adhere to it.

But all these preferences, extravagant as they may be thought, "hide their diminished heads" when brought in competition with the far-famed *ginseng*. Of this the missionaries and other Chinese travellers have told the most marvellous stories, and the natives themselves still attribute to it miraculous powers. The Americans have in vain endeavoured to imitate the Chinese mode of preparing it; and though they buy it at remunerating prices of from 35 dolls. to 200 dolls. per pecul; yet they ascribe to it no virtues when compared with their own of Tartaric origin. For the latter they pay the enormous prices of from 20 to 250 times its weight in silver; and some choice picked specimens have actually brought (from wealthy epicures) the almost incredible price of 500 times their weight in solid silver. Mr Reeves states that he saw such a piece, carefully shut out from profane eyes, and excluded from the air by being inclosed in two or three canisters one within the other.—  
*Journ. Morb. Anat. &c.* B. E.

## Miscellany.

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*Iodine in muriate of soda.*—This fact was discovered by M. Barruel, when about to prepare some muriatic acid for the lecture of M. Orfila at the Faculty of Medicine of Paris. He poured some sulphuric acid on the marine salt, and immediately the matrass was filled with violet vapours: disconcerted with this result, he tried the experiment again with a fresh and different portion of salt, but the same consequences followed, and the violet colour was perceived by the class. This vapour condensed itself on the conducting tube in the form of beautiful brilliant plates, of a bluish grey hue. Finally it was dissolved in the hydrochloric acid, and coloured it of an orange red, which finally changed to a greenish yellow. He *denominates* it the *grey* muriate of soda, and supposes the salt spring, from which it was made, to be contaminated with a hydriodate, either originally or by having been repaired with materials which contained the iodine in a latent state.

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*Morphia extracted by fermentation from opium.*—In our last number we mentioned the fact that M. Blondeau had employed fermentation successfully to separate morphia from opium. The following is a short account of the process he employs. Take pure opium and subject it to the action of twice its weight of warm water; to this add the yeast of beer, and suffer the fermentation to proceed until it ceases. Filter through linen and wash the residuum; mix the liquors and add to them ammonia to precipitate the



morphia. Collect the precipitate, wash and treat it with water sharpened with hydrochloric acid; filter and evaporate. The hydrochlorate is procured in a coloured mass, which treat with water and animal charcoal. Decompose this salt with ammonia, and crystals will form of a yellowish amber colour. These crystals are morphia sufficiently pure for ordinary use. M. Blondeau states that he has obtained thirteen or fourteen gros (drachms) of morphia from 1 lb. of pure opium by the employment of this process. He proposes to apply it to the separation of morphia from the indigenous poppy.—*Journ. de Chimie Med. de Pharm. et de Toxicolog. Sept. 1828.*

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*Carthageria bark.*—On the 26th of July 1828, M. Pelletier stated that having experimented on a variety of bark, which the sellers called *calysaya*, and the buyers *carthageria*, he had ascertained that this substance was not a cinchona, and that it contained a particular substance which was neither quinine nor cinchonine. It formed with sulphuric acid a salt of a gelatinous appearance, and with muriatic a crystallizable pearly salt.—*Journ. de Chim. Med. de Pharm. et de Toxicolog. Sept. 1828.*

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*Sulphate of zinc and sulphate of magnesia.*—It ought to be generally known, if it is not, that the sulphate of zinc may be crystallized in such a form as closely to resemble the sulphate of magnesia; so much so that that they may be mistaken for each other. MM. Labarraque and Lecanu called the attention of La Société de Pharmacie to this fact in January last, and stated that the difference between these salts might be readily ascertained by adding a solution of caustic potash. This will occasion a precipitate, and if it be the sulphate of zinc that is operated on, an excess of the alkali will occasion the precipitate to be redissolved, an event which will not follow the application of the test to the sulphate of magnesia.—*Journ. de Pharm. Jan. 1829.*

*Parillina* or the active principle of *sarsaparilla*.—M. Galileo Pallota has separated from this root an alkaloid substance, in which he supposes the virtue of it resides. We have not met with a process for procuring it, but it is probable it may be obtained by a formula the same in principle as that used for the extraction of quinine and other alkaloids.

It is described to be a white salt, pulverulent, light, permanent in the air, austere, slightly astringent, nauseous, and having a peculiar odour. It is insoluble in cold but very soluble in hot water. Slightly soluble in cold, very soluble in hot alcohol. It *reddens* turmeric paper, fuses at 212°, and is decomposed at a higher temperature: forms a sulphate with diluted sulphuric acid, but is decomposed by the strong acid. It forms neutral salts with the other acids.

From experiments made upon himself M. Pallota considers that *parillina* is a powerful debilitating medicine, diminishing the vital energy in proportion to the dose. The dose is from two to thirteen grains.—*Thomson's Dispensatory, from Journal of Science.*

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*Active principles of polygala senega*.—From six ounces of this root Peschier separated 100 grains of a peculiar alkaline principle, which he has named *polygalina*—united with a new acid, which he has denominated the *polygalinic*; and this salt he supposes to be the active principle of Seneka root.—*Pharmacop. Batav. Lipsiæ, 1824.*

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*Kino*.—All the varieties, according to Vauquelin, contain a species of tannin, but no gallic acid. They dissolve in solutions of pure potass and of ammonia, and no precipitation takes place on the addition of water. Some chemical change however is effected, and the astringent property of the kino is completely destroyed, a fact which ought to be kept in remembrance in prescribing this remedy.—*London Dispensatory, 4th edition.*



*Watery extract of aloes.*—Mr Battley has made some simple experiments on the aloes vulgaris, or Barbadoes aloes, by which it appears, that the cold watery solution, evaporated to the consistence of an extract, contains all the valuable part of the medicine, divested of its acrid or drastic principles.

The following is the process employed:

“1. Two pounds avoirdupois, or 2 lbs. 4 oz. 2 dr. 48 grs. apothecaries’ weight, of the extract of aloes, in the state in which it is imported from Barbadoes, imparted to cold distilled water 1 lb. 9 oz. 1 dr. 42 grs. The solution was of a fine yellow brown colour; its taste intensely bitter, yet free from the flavour peculiar to this species of aloes.

“2. The residuum of No. 1. imparted to hot distilled water 2 oz. 15 grs., leaving 4 oz. 2 dr. 15 grs. of undissolved matter. The solution was darker than No. 1. inclining to purple, less intensely bitter, but having the peculiar flavour of the aloes vulgaris.

“3. The residuum of No. 2. imparted to alcohol 3 oz. 4 dr. 48 grs., leaving 5 dr. 27 grs. insoluble in this menstruum. The tincture was of a deep brown colour, bitter and very offensive both to the taste and smell.

“4. The residuum of No. 3. imparted to one part of liquor potassæ diluted with seven parts of water, 4 dr. 48 grs., leaving 5.79 grs. of a dark earthy appearance, deprived of all aloetic properties, and void of any qualities that the taste or smell could detect. Even the alkaline solution, No. 4., of a deep, heavy brown colour, was so slightly aloetic as to be nearly insipid and inodorous.

“In No. 1. or the cold solution of the aloes again reduced to an extract, the profession will find at its disposal a valuable medicine; but the results Nos. 2, 3, will probably be found too drastic, and Nos. 4, 5, absolutely inert.”—*Medico-Chirurg. Review, from Journal of Morbid Anatomy.*

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*Bitter of aloes.*—*Carbazotic acid.*—The peculiar substance resulting from the action of nitric acid upon aloes, combines



with bases, and forms salts which detonate by heat: this is the aloetic acid of Braconnet. Mr Liebly has lately ascertained that this detonating principle is the carbazotic acid.

The bitter of aloes is plentifully obtained by the action of nitric acid of sp. gr. 1.25. With potash it forms a purple, slightly soluble salt, which precipitates the salts of baryta, lead, and peroxide of iron in flocks of a deep purple colour: the protonitrate of mercury is precipitated of a light red. Acetate of lead was employed to decompose the salt of potash, and, contrary to expectation, the weight of the precipitate was less than that of the salt of potash employed. The washings were of a yellow colour, and deposited crystals of the same character as the precipitate. These crystals were treated with sulphate of potash and heat, and yielded carbozate of potash, from which the carbozatic acid was separated. Another mode is to unite by heat aloes and nitric acid of 1.432, and after vapours cease to escape, add water to precipitate the bitter matter: to the remaining liquor add potash sufficient to saturate it and evaporate. The result will be crystals of carbozate of potash in fine crystals. The bitter of aloes appears therefore to be a compound consisting of a resinous matter and the above named acid.—*Phil. Mag. and Annals of Philosophy, Vol. IV. p. 67.*

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*Corrosive sublimate rendered more soluble in alcohol and ether by the addition of camphor.*—Four parts of ether at the common temperature dissolve one part of corrosive sublimate, and M. Karls states that he has convinced himself of the following facts:

Three parts of ether dissolve one part of sublimate and one of camphor;

Four parts of ether and four of camphor dissolve two parts;

Four parts of ether and eight of camphor dissolve four parts;

Four parts of ether and sixteen of camphor dissolve eight parts of sublimate.

It is evident therefore that the solubility of the corrosive sublimate in ether is augmented in direct proportion to the quantity of camphor added.

The dissolving power of alcohol is equally increased; thus, at the ordinary temperature three parts of alcohol dissolve one of sublimate.

One part and a half of alcohol and half its weight of camphor also dissolve one part of corrosive sublimate.—*Journal de Chimie Medicale, &c. from Annales der Physick und Chemie*, 1827.

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*Process for preparing the red ferro-cyanuret of potassium.*—This substance is noticed by M. Berzelius in his work entitled "*Analysis of Inorganic Bodies*," as among the useful reagents for the analysis of mineral waters. The following process, due to M. Gmelin, was employed by M. J. Girardin, attached to the central pharmacie of Paris.

Pass through a concentrated solution of ferro-prussiate of potassium, a stream of chlorine, until the liquor, which at first would precipitate of a blue colour the salts of iron at its *maximum* of oxidation, ceases to effect any change of colour or disturbance in them. Concentrate the liquor to two-thirds of its volume and set it to crystallize in a stove lightly heated: at the end of some time brilliant yellow needles will be obtained disposed "*in rosaces*." By a second crystallization, very delicate needles are formed grouped in tufts, some of them large, others very small. The needles are of a ruby red colour, transparent, and very brilliant. M. Girardin regards them as octahedrons, very much elongated.

The leading feature of this salt, and which recommends it as a test is, that it precipitates the salts of the protoxide of iron of a green or blue colour, according to the quantity in solution, but on the contrary does not precipitate the salts of the peroxide of iron.

It is a much more delicate reagent, than the yellow ferro-cyanuret of potassium, since it detects 1-90,000 of the



protoxide of iron, whilst the latter indicates only 1-18,000 of this substance. It dissolves in twice its weight of cold, and less than its weight of boiling water.

Alcohol at 32° B. does not sensibly dissolve it, and absolute alcohol precipitates it from its aqueous solution in the form of a yellowish powder. The odour of this salt is slightly saponaceous; it does not act on turnsol, but changes to green the syrup of violets.—*Journ. de Chem. Med. de Pharmac. et de Toxicologie.*

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*Iodine in Saratoga Water.*—William Usher, a student of Rutgers' medical college, communicated to professor Griscom the following experiments, proving the existence of iodine in Saratoga water. To a portion of the water of the congress spring, concentrated to about one-twelfth of its volume, he added a solution of starch, and then a small portion of sulphuric acid, in order to decompose (probably) the hydriodate of soda. The characteristic colour was immediately manifested, and was instantly discharged again by the addition of a solution of chlorine. Professor Griscom thinks it very probable that the presence of this substance adds to the medical efficacy of the water, especially in scrofulous diseases.—*American Journal of Science and Arts, No. I. April 1829.*

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*Analysis of Jalap.*—M. Gerber (Brande's Archiv.) has endeavoured to find in the root of jalap, the alkaloid, designated by M. Hume, as *jalapine*; and is satisfied that this pretended alkali is nothing more than a mixture of resin and acetic acid. The researches of M. Dulk, published in the *Berliner jahrbuch der Pharm.* respecting jalapine, appear to confirm this opinion.—*Journal de Chimie Medicale de Pharm. Toxicolog. August 1828.*



# JOURNAL

OF

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*NEW SERIES.*

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**Original Communications.**

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*On Carbonate of Ammonia. By Daniel B. Smith.—Read before the College, December 1827.*

The volatility of this salt renders it extremely difficult to preserve uninjured in vessels that are occasionally opened to the air. When in its perfect state it is composed of one atom or twenty-two parts of carbonic acid, and one atom or seventeen parts of ammonia. There is, besides this salt, another combination of carbonic acid and ammonia, containing two atoms of acid or forty-four parts and one atom, or seventeen parts of alkali. This salt which is the bicarbonate, has no smell and less taste than the carbonate. It is formed when the latter salt is exposed in powder to the air. The carbonate of ammonia of commerce is now obtained in great part from the tarry liquid obtained in the distillation of coal gas. It is sublimed in moderately hard semi-transparent cakes, which are brittle and white. By ex-

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posure to the air, part of the alkali soon escapes; it loses its strong smell of ammonia, and is gradually converted into the inodorous bicarbonate. So rapid is the progress of this change, that it is seldom we meet with the article in our shops which is not more or less injured by it. The first sign of the loss of alkali, is the efflorescence on the surface, which gradually extends till the whole crystalline mass is altered. It is from this cause that we have so much difficulty in pleasing those who are particular about the quality of their "smelling salts."

A preparation, called "the Preston smelling salts," has within a few years been introduced from England, and has deservedly been much sought after. The manufacturers have wisely put it up in very wide mouthed bottles, which enable one to inhale a much larger quantity of ammonia at once, and thus increase the apparent strength of the salt. But it has other qualities to recommend it, than the manner in which it is put up for sale. It retains its odour for a longer time and wastes more slowly than the common smelling salts.

It was generally believed, when the article was first brought here, that its superiority was owing to the sublimation being made at once into the bottle, so as to avoid any loss of ammonia by unnecessary exposure to the air. An examination, however, will satisfy any one that the salt is *crystallized* and not sublimed. The superior compactness and hardness of a crystalline over a sublimed salt, are great advantages in so volatile a substance as the carbonate of ammonia; and to this, I have no doubt the good qualities of the Preston salts are to be attributed.

The salt may be crystallized with great facility in the winter season. The plan which I have followed is to dissolve, in a pint of pure aqua ammoniæ, a pound and a quarter of the crystalline carbonate of ammonia with a gentle heat.

By exposing this to a freezing temperature, crystals of the carbonate of ammonia will be obtained, the size and hardness of which will depend upon the length of time which they require to crystallize. I use the aqua ammoniæ as a



solvent to secure the formation of a salt with the minimum of acid.

I recommend to those apothecaries who wish to procure an excellent carbonate of ammonia to adopt this process, which will furnish them with a salt in all respects equal to the Preston smelling salts, at one-eighth of the price which the latter costs us.

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*Xanthoxylum Fraxinæum.* By Edward Staples, M.D.

*Xanthoxylum fraxinæum* is a North American shrub of moderate size, growing in shady places in the northern, middle and western states. Botanists have placed it in the class pentandria and order pentagynia of the sexual system of Linnæus: it is however diœcious or polygamous, and is now found in the class diœcia and order pentandria. Its leaves are pinnate, and have some resemblance to those of *fraxinus tomentosa* of Micheaux; leaflet, ovate, sub-entire, sessile, and equal at the base. It flowers in April or May, before the leaves have expanded in axillary sessile umbels. Professor Bigelow has observed the flowers of three kinds.

The leaves are aromatic, having the smell of the rind of lemon, the capsules also are highly fragrant. The leaves abound in mucilage, and give indications of the presence of gallic acid.

The bark, which has considerable reputation for its medicinal virtues, has a slightly aromatic flavour, which, like the aroma of the leaves and capsules, is due to the presence of essential oil; it has also a strong pungency, which is slow in manifesting itself, gradually developing a sensation of warmth in the throat and fauces.

The tincture of the bark contains its qualities in a con-



centrated form. It is bitter, and acrid; properties which are owing to the presence of a peculiar crystallizable vegetable substance analogous to piperine, and of a fixed oil intimately associated with it. This peculiar vegetable substance it may not be improper to denominate xanthoxyline, a name having reference to the genera of the plant.

The medicinal properties of *xanthoxylum fraxinæum* closely resemble those of *guaiacum* and *mezereon*. Like them it is advantageously used in chronic rheumatism, and in complaints where the object in view is to establish an indirect revulsive action on the external surface. It is probable that its use as a substitute for some of the articles employed in the preparation of compound syrup of *sarsaparilla*, or as an additional article to the compound, would be attended with satisfactory results.

Professor Bigelow, who has introduced the plant into his Medical Botany, has used the bark of *xanthoxylum fraxinæum* with decided advantage; and Dr George Hayward has experienced in his own person its medicinal virtues. The latter gentleman employed a decoction made from one ounce of the bark to one quart of water, a pint of which was taken daily; the decoction was found to be grateful to the taste without any decided action on the stomach or bowels. *Xanthoxylum clava Herculis*, a native of the West Indies, is there advantageously used internally, and externally applied as a detergent and stimulant to foul ulcers.

The following is the method employed to extract xanthoxyline from the bark of *xanthoxylum fraxinæum*. One part by weight of the bruised bark was digested in two parts of pure water for about three days at the common temperature of the air; to this were added eight parts of alcohol of 35° Beaumé, and the digestion suffered for three days more, when the tincture was separated by filtration, and concentrated in an apparatus for distillation in which a water bath was employed; when reduced to about one-fourth the quantity obtained by filtration, while yet hot, it was thrown into eight parts of pure water of a temperature of 120° Fahrenheit;

it was then set aside to cool gradually ; when cold, crystals of xanthoxyline were formed on the sides and bottom of the vessel into which the concentrated tincture was thrown. They were coloured by the presence of a pungent greenish oil ; this oil may be separated in part by sulphuric ether.

Xanthoxyline, when the oil has been removed by ether, is readily soluble in heated alcohol. Its crystals have sides alternately equal, of which there are four. When mixed with impurities in the first crystallization they form in thin laminæ somewhat squamous.

Xanthoxyline is a compound of hydrogen, oxygen, and carbon, in proportions not ascertained.

#### *Chemical analysis.*

The bark of xanthoxylum fraxinæum, besides fibrous substance, contains volatile oil, fixed greenish oil, xanthoxyline, resin, gum in small quantity, colouring matter.

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*On the Difference between Minims, Drops, and Grains, of Various Liquids, and on the Propriety of using exclusively the Minim Measure in prescribing Active Fluid Medicines. By Elias Durand.*

The difference between the bulk of drops of various liquids was long since observed, without, however, any immediate attempt being made to discover the cause of this discrepancy ; which was merely attributed to the variable density of the fluids. Dr Shuttleworth of Liverpool appears to have been the first who ascertained, by careful experiments on the weights of drops of different liquids, the inaccuracy and danger of exhibiting active fluid substances in this form. The results of his experiments were justly appreciated, and



an important change soon afterwards introduced by the College of Physicians of London. Their object being to insure accuracy in the measurement of fluids below one drachm, they subdivided the wine pint down to the sixtieth part of a fluid drachm, and called each of the ultimate divisions a *minim*.

Induced by particular motives to ascertain the exact difference between the *minim* and the drop of several liquids, I undertook a series of experiments, which were extended to the grain weight.

The results surprised me so much, that they appeared worthy of careful repetition, with a view to publication, believing they might prove useful to the physician as well as the pharmacist.

The following table, based on accurate experiments frequently repeated, will show at once, by careful inspection, how much this subject is deserving the particular attention of professional men; and how great a desideratum is the early and general adoption of an accurate measure, instead of the uncertain and variable mode of dropping active fluid medicines. The bulk of drops depends not only on the density of the liquid which furnishes them, and the cohesion of the constituent particles of that liquid, but also on the shape of the mouth of the vessel, from which they are poured. An open vessel with a beak, such as the common graduated measure, affords a larger drop than a bottle with the stopper half drawn out, a mode commonly practised. That furnished by the dropping tube is still smaller, and is even liable to vary with the greater or lesser diameter of its extremity. Besides, in every instance, the first drops poured from any vase are always smaller than those subsequently obtained.

It is evident, from the above considerations, that the practice of prescribing fluid medicines by drops is altogether objectionable; and especially at the present time, when so many proximate principles of very energetic vegetable substances are daily introduced into practice, which may be



indifferently administered in aqueous, acetous, vinous, or alcoholic menstrea.

The table below satisfactorily proves to what serious consequences an ignorance of these facts may lead the physician and the pharmacist. For instance, hydriodate of potassa is soluble in alcohol as well as water, and these solutions may be indifferently employed as remedies in the same cases. Yet twenty drops of the alcoholic solution are equivalent to  $\text{m. x.}$  and to  $\text{gr. ix.}$ ; whilst the same number of drops of the aqueous solution are equal to  $\text{m. xxij.}$  and to  $\text{grs. xx.}$ ; although they scarcely differ in specific gravity, and contain the same proportions of hydriodate of potassa in solution. It is obvious then that though the effects of these solutions be the same, they cannot safely be prescribed in doses containing the same number of drops, since the latter would be more than twice as strong as the former.

Colchicum yields its remedial principles to vinegar, wine and alcohol. Fifty drops of the acetous or vinous solutions are equal in bulk to eighty drops of the alcoholic tincture; a circumstance which has not before been pointed out, and is probably the reason why the two former preparations have been considered so much more active than the latter; although were they administered in minims, they would, in all probability, prove equally beneficial in the same doses. These remarks apply to many other substances which yield their active principles to alcohol, wine, water, &c.

As the slight difference between the minims of various liquids depends entirely on the slight variation in their specific gravities, the minim measure is not liable to the irregularity and uncertainty of drops, and is of course the best fractional mode of prescribing energetic liquids; inasmuch as the solvent is almost invariably directed by the pharmacopœia in fluid measure.

The experiments, which form the subject of this paper, were performed with accurate instruments on the principal liquid preparations of the United States Pharmacopœia, and on a few others peculiar to foreign pharmacopœias. The

minim measure was made with particular care by my ingenious friend Mr Daniel B. Smith; the drops were all obtained from the same drop glass with a tube of medium calibre; the scales and weights were very accurate, and every means used to prevent the escape of volatile fluids.

With respect to the size and weight of the drops of the various liquids, we may establish as general rules from the following table:

1. That the liquids which contain a *small proportion* of water afford a *small drop*; while, on the contrary, the liquids containing a *large quantity* of water furnish a *large drop*. For instance, *concentrated acids, ethers, rectified alcohol, fixed and essential oils, &c.* which contain but a very small proportion of water, yield a *smaller* drop than diluted acids, weak alcohol, *wine, vinegar, &c.*

2. That amongst the liquids containing a *large proportion* of water, those which are not charged with remedial substances give a larger and heavier drop than these same liquids containing extraneous bodies in solution. As for example, *weak alcohol, wine, vinegar and water*, furnish a *larger and heavier* drop than the tinctures prepared from them.

It is difficult to account for these peculiarities; but I am inclined to think that in the first instance the molecules of water have a stronger cohesion or affinity for each other than those of the other liquids, and require consequently a greater accumulation of particles before the drop can be forced by its own gravity to separate from the aqueous mass. In the second, the cohesion is probably impaired by the interposition of the bodies in solution.

In adopting the minim measure, the editors of our national Pharmacopœia have not given their reasons for the change, and have left us in the dark respecting the difference between the two modes of administering small quantities of active liquids. It is owing to this neglect in part, that so little attention has been paid to the subject in this country, and that so many professional men continue to consider the subject as a mere alteration of words.



The following table will illustrate my remarks :

| <i>Table showing the differences between Minims, Drops, and Grains of various Medicinal Liquid Preparations of the Pharmacopœia of the United States, &amp;c.</i> |   |   |   |   |   | No. of drops<br>in 20 minims. | No. of min.<br>in 20 drops | No. of drops<br>in 20 grains. | No. of grains<br>in 20 drops. |
|---|---|---|---|---|---|-------------------------------|----------------------------|-------------------------------|-------------------------------|
| Sulphuric acid  | - | - | - | - | - | 30                            | 13.3                       | 25                            | 16                            |
| Sulphuric ether   | - | - | - | - | - | 50                            | 8                          | 60                            | 6                             |
| Rectified alcohol   | - | - | - | - | - | 46                            | 8.6                        | 57                            | 7.1                           |
| Nitric acid   | - | - | - | - | - | 28                            | 14.2                       | 22.2                          | 18                            |
| Acetic acid (crystallizable)  | - | - | - | - | - | 40                            | 10                         | 40                            | 10                            |
| Muriatic acid   | - | - | - | - | - | 18                            | 22.2                       | 18.1                          | 22                            |
| Oil of wormseed (chenopod. anthelminticum)  |   |   |   |   |   | 40                            | 10                         | 50                            | 8                             |
| of peppermint, aniseed, sweet almond,<br>olive, palma christi   | - | - | - | - | - | 40                            | 10                         | 43.5                          | 9                             |
| of cloves   | - | - | - | - | - | 40                            | 10                         | 36                            | 11                            |
| of cinnamon   | - | - | - | - | - | 40                            | 10                         | 32                            | 12.5                          |
| Copaiba   | - | - | - | - | - | 40                            | 10                         | 40                            | 10                            |
| Diluted alcohol   | - | - | - | - | - | 40                            | 10                         | 42                            | 9.5                           |
| Tincture of hydriodate of potassa, cantharides,<br>kino, digitalis, assafoetida, sulph. acid,<br>colchicum, opium, valerian, guaiacum                             |   |   |   |   |   | 40                            | 10                         | 43                            | 9.3                           |
| of valerian, guaiacum (volatile)  | - |   |   |   |   | 40                            | 10                         | 50                            | 8                             |
| of muriate of iron  | - | - | - | - | - | 44                            | 9.1                        | 50                            | 8                             |
| Wine, Teneriffe   | - | - | - | - | - | 26                            | 15.3                       | 25                            | 16                            |
| antimonial  | - | - | - | - | - | 24                            | 16.6                       | 26                            | 15.3                          |
| of opium (Sydenham's laudanum)  | - |   |   |   |   | 26                            | 15.3                       | 29                            | 13.7                          |
| of colchicum root and seeds   | - |   |   |   |   | 25                            | 16                         | 29                            | 13.7                          |
| Vinegar, distilled  | - | - | - | - | - | 19                            | 21                         | 20                            | 20                            |
| of opium (black drop)   |   |   |   |   |   | 26                            | 15.3                       | 25                            | 16                            |
| of colchicum  | - |   |   |   |   |                               |                            |                               |                               |
| of squill   | - |   |   |   |   |                               |                            |                               |                               |
| Water, distilled  | - | - | - | - | - | 15                            | 26.6                       | 17.5                          | 24.5                          |
| solution of hydrocyanic acid  | - |   |   |   |   | 15                            | 26.6                       | 17.5                          | 24.5                          |
| sulphuric acid, (1 to 7)  | - |   |   |   |   | 17                            | 23.5                       | 17                            | 23.5                          |
| nitric acid do  | - |   |   |   |   | 17                            | 23.5                       | 17                            | 23.5                          |
| ammonia (strong)  | - |   |   |   |   | 18                            | 22.2                       | 18.5                          | 22                            |
| do. (weak)  | - |   |   |   |   | 15                            | 26.6                       | 20                            | 20                            |
| hydriodate of potassa   | - |   |   |   |   | 18                            | 22.2                       | 20                            | 20                            |
| arsenite of potassa   | - |   |   |   |   | 19                            | 21                         | 20                            | 20                            |

\* Prepared according to the process of the London Apothecary Hall.



*Geranium Maculatum.* By Edward Staples, M.D.

*Geranium maculatum* is a plant of the class monadelphia, and order dicandria of the artificial system of Linnæus. The root is perennial, horizontal, gibbous; and commonly about six lines in diameter. It is brownish, mottled with green externally, and of a light colour within, becoming brittle when dry and then readily pulverizable. From the root arise generally one stem and from four to eight root leaves, supported by petioles from eight to ten inches in length. The stem is erect, terete, thickly beset with reflexed hairs, and forked; leaves opposite, three to five, parted. Peduncles mostly two flowered; petals obovate, entire. This plant has a very extensive geographical range, abounding plentifully from Canada to the southern boundary of the United States. It is found on the borders of damp woods, the skirts of fields, and in hedges, generally preferring low grounds to elevated situations. Its common height is from twelve to eighteen inches, but in very favourable situations it grows to the stature of two and a half feet, and is then one of the most beautiful of our native plants.

The medical virtues of the *geranium maculatum* reside, exclusively, in the root, and these entitle the plant, according to experience and chemical analysis, to be ranked under the head of astringents in the *materia medica*. Its use in apthous affections of the mouth is commended as a pleasant and efficacious remedy; and in most cases where this class of remedies is indicated, it is more than probable that the *geranium maculatum* will answer the purpose of more conspicuous astringents. From twenty to forty grains of the dry root in powder, or its equivalent in tincture or decoction, is the appropriate dose.

*Chemical analysis.*

Professors Barton and Bigelow, in their botanical works, have respectively described, especially, the botanical aspect

of this plant, and the latter gentleman has also indicated some of its chemical characters. Dr Bigelow found, that the solution indicated the presence of gallic acid and tannin, and that it afforded a larger precipitate with gelatin than kino, when similarly treated. Dr Bigelow also states, that the solution did not affect litmus; which is entirely at variance with my experience, having found that the tincture and subsequent solution from the same roots, both acted decidedly on that substance.

The *geranium maculatum*, besides fibrous substances common to vegetables, contains gallic acid in large quantity, tannin, mucilage in small proportion, amadin, red colouring matter, principally in the external covering of the root, resin in small quantity, a crystallizable vegetable substance.

The medical virtues of the plant reside without doubt in its astringency, and are probably entirely independent of the last substance enumerated.

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*Remarks on the Preparation of Citrine Ointment. By W. R. Fisher, Graduate of the Philadelphia College of Pharmacy.*

The preparation of the ointment of nitrate of mercury—*unguentum hydrargyri nitratis* of the pharmacopœias, so that its brilliant golden yellow colour may be preserved, and that it may retain a proper degree of softness and consistence—has long been a desideratum in pharmacy.

The chief defects in the ointment prepared agreeably to the directions of the pharmacopœias, are, its tendency to loss of colours, and its want of proper consistence; they also fail to direct whether it be a peroxide or protoxide of the metal, which should exist in the salt. The two former faults have



been attributed, by most writers on the subject, to the action of the excess of acid in the nitrate of mercury on the lard which enters into the constitution of the ointment.

Thompson says, "the excess of acid in the metallic solution oxidizing the fatty matters, occasions them to become hard and brittle, if more than one sixth of lard be employed." Dr Duncan, in the Edinburgh Dispensatory, asserts "the hardening to be entirely owing to the lard alone." To whatever cause it may be attributed, there exists no doubt that it does occur, though, as we believe, it is owing to another cause than that to which it is charged.

Under the former impressions, however, many improvements have been suggested. Among others the following by Dr Duncan:—"the property which nitrate of mercury, prepared by *ebullition*, has of being decomposed by water, furnished me with an easy way of getting rid of all excess of acid, and of procuring the subnitrate of mercury in a state of the most minute division possible. An ointment prepared with this substitute had a most beautiful golden colour; after six months was perfectly soft, and had all the properties desired."

We are not informed by any authority, whether a *per* or *proto* nitrate of mercury is intended for the base of the ointment. The dispensatories all fail to direct the employment of *heat*, in effecting the solution of the metal in the acid; the inference, therefore, is that it is intended no heat should be employed.

The result of the solution, therefore, as directed by them, must be a *nitrate* of the *protoxide*. This salt then should be considered, as the one intended, of which the ointment should be composed.

Now, admitting that the ointment prepared by Dr Duncan's method will retain its properties, still, it will not be the ointment intended by the pharmacopœias; for his salt is prepared by *ebullition*, and hence must be a nitrate of the peroxide. For the salts of nitric acid, prepared by boiling, always contain the maximum quantity of oxygen. Of the



relative properties of the salts, as medicinal agents, we profess ourselves ignorant, and deem it inconsistent with our present purpose to inquire. We only endeavour to point out the want of definite instructions in all the dispensatories, and to recommend to the notice of the profession of pharmacy, a formula which we have prepared, with a view to insure an ointment uniform in its nature, as well as to retain after several months the requisite colour and consistence.

The recollection that nitrate of mercury hardened *vegetable* oils, induced us, after having failed in every other experiment, to prepare some with an *animal* oil, the common well known neat's foot oil. The ointment prepared with this realized our hopes, and the success of the experiment was so complete, as to induce us thus to make known its advantages. The following formula will be found to justify our assertion, if prepared agreeably to its accompanying directions.

Take of Pure mercury, 3j.

Nitric acid, 3ij.

Neat's foot oil (fresh), 3ix.

Lard, 3iij.

Dissolve the mercury in the acid at a low temperature, melt the lard and oil, and pour them melted into a wedge-wood or glass mortar.

When the mixture is beginning to grow cold, add the metallic solution, constantly stirring until the whole is thoroughly mixed.

The ointment thus prepared is of a brilliant golden yellow colour, and remains soft for some months. Its consistence is entirely different from the old ointment, and resembles more in its texture that of basilicon. We feel fully convinced, that whoever will prepare citrine ointment by this formula, will readily perceive its advantage.

## Selected Articles.

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### *On Weights.*

[We have selected the article on weights from Gray's Elements of Pharmacy and Materia Medica, a work abounding in curious and highly useful information, and we believe not accessible to the generality of our readers.

To the students of pharmacy, we would recommend the perusal of this paper carefully and repeatedly. Accuracy of knowledge will lead to accuracy of practice, and in none of the avocations of men are care and nicety more imperatively required than in that of the apothecary, dispensing medicines to his suffering fellow creatures. We have reason to believe that the difference between the avoirdupois, and apothecary's or troy weights, is too frequently overlooked in the composition of important remedies, and that they are indiscriminately used in the formation of compounds. We do not say this is always the case,—we know to the contrary; but we have met with persons, who appeared ignorant of the difference, and of course who would adopt the mode mentioned above, perhaps to the detriment of the patient.

It would have been preferable, as Mr Gray remarks, had the troy weight never been introduced, as it certainly tends to confusion in the management of a branch of medicine, which should be as much freed as possible from all the sources of error. But since such is the custom of the profession, sanctioned by long habit, it had better be steadily and uniformly adhered to.

In publishing this chapter, we do not hold ourselves responsible for any of Mr Gray's prejudices or opinions with respect to contemporary schools of science. We feel ourselves obliged to him for much valuable information derived from the perusal of his work.

With respect to the troy weights employed by the apothecaries of this city, it may be observed that, as a general rule, they are not correct. From their rough and unfinished appearance, one might infer there was not much attention to scrupulous accuracy in their manufacture. We would therefore recommend to the apothecaries to get a set of standard weights, and compare those they have in daily use with *them*. We have seen this done in one of the shops, and the difference being too obvious to fall unnoticed, the proprietor, one of our most scientific apothecaries, immediately commenced their rectification. As the common weights generally exceed the proper standard, they only require to be filed away carefully to make them correspond.

The same remarks apply to the common graduated measures, which are so very inaccurate as to render them totally unworthy of confidence in the manipulation of important remedies. Every apothecary should perform the duty of affixing a paper scale to his measures, by actual experiment, before sending them to the glass cutters to be engraved; or purchasing those only which he knows to have been thus carefully graduated, and by a skilful hand.]

The quantity of the bodies we employ in our experiments or operations, is most accurately determined by their weight; but that this weight may be communicated to others, it must refer to some natural standard. For this purpose, the weight of some certain number of seeds, or of a single seed, not liable to variation, has been usually chosen. Latterly, the length, or a portion of the length of a cylindrical pendulum, that vibrates a certain period of mean solar time, or of a small portion of the earth's circumference, has been proposed to form the side of a cubical vessel to be filled



with water, and the weight of this water to form the standard. Of the mensuration of the circumference of the earth to make a standard for weight it is needless to speak, since it is mere philosophical quackery; the pendulum that vibrates seconds of time in the capital of each state, is a more manageable mean, and is very fit to form the basis of an inquiry into the actual standards of weights and measures of any country, and to communicate the result to foreign nations in a manner intelligible to scientific men, however Butler may have attempted to ridicule the idea in his *Hudibras*, part ii, canto 3, line 1019. To enable, however, ordinary persons to verify their own weights, or those of their neighbours, the mode proposed by our old lawgivers, and improved upon by Tippoo Sultan, is the only one that can be adopted; as seeds are easily procurable by all, and do not require the expense either of a recurrence to the authentic standards, which in the Exchequer amounts to 36s. 4d. for the officer's permission, and 2s. 6d. to the yeoman for sizing them; or of the construction of a delicate apparatus to verify a set of weights and measures. If we may judge from the present standards, which are evidently inaccurate, since the parts do not agree with the whole, nor the different standards of the same name agree with one another, seeds are less variable than them. The numerical weight of seeds being less affected than might be supposed from their apparent difference of bulk, or even their different weight by the bushel, and the variation from soil or other causes may be in great measure avoided by Tippoo's method of taking the average of nine different kinds of seeds. Diamonds and other jewels, the most valuable articles known in commerce, are weighed by the seeds of the kurua tree, in preference to artificial weights.

From a careful examination of the standards in the Exchequer it has been found; that a pendulum which would in London on the level of the sea vibrate in a vacuum seconds of mean solar time, measures 39.13 inches of the standard yard of 36 inches, a copy of that constructed ori-

ginally by taking the length of three barley corns for an inch. 2dly. That a cubic inch of distilled water, at 62 deg. Fahr. weighs in a vacuum 252.722 grains Troy; or at 39 deg. at which temperature water is at the maximum of density, 253 gr. but in the open air, under the common circumstances of the atmosphere and counterpoised with brass weights, 252.456 grains; the grains being originally constructed by assuming the old penny piece of silver weighing 32 grains of red wheat taken from the middle of the ear, to weigh 24 grains Troy.

*Avoirdupois, or Roman Weight.*—The commonest weight in use, and therefore, without doubt, the most ancient, is that called at present avoirdupois, but which seems to have been formerly denoted by the name of auncel weight, from its being weighed, according to the Roman usage, by the statera Romana or stilliard, or by the auncel, ansula, or Danish stilliard, with a fixed weight and movable fulcrum. It seems to have been introduced by the Romans at the first civilization of this island, and although kept up chiefly by the stilliard, has descended so accurately to our time that the 12 oz. pound varies only 11 gr. Troy from the standard still kept at Rome. The word haberdepois is first used in our laws in 1303, 31 Edw. I. but as a class of merchandizes including wine as well as corn. In 27 Edw. III. wools, and all manner of averdepois were ordered to be weighed by even balance, and not by the auncel. In 1533, 24 Hen. VIII. the name first occurs as applied to this weight, butchers being ordered to provide beams, scales, and weights, called haberdepois; and Elizabeth, 1586, caused the present weights in the Exchequer to be made, from those preserved in the hall of the Founders company, and by her prerogative proclaimed them to be standards; the weight, however, has never yet received any parliamentary sanction, but has continued in use in spite of the Saxon and Danish conquests, and the attempts repeatedly made to establish the Norman Troy weight in its place.



The avoirdupois weight is thus divided, and to its several divisions are affixed their value in grains Troy.

|  | Equivalent weight in Troy grains. |
|--|-----------------------------------|
| 1 grain English . . . . .                            | 0.77                              |
| 24 = 1 scruple English . . . . .                     | 18.22                             |
| 36 = 1½ = 1 adarme of silk . . . . .                 | 27.34                             |
| 72 = 3 = 2 = 1 dram English . . . . .                | 54.69                             |
| 576 = 24 = 16 = 8 = 1 ounce . . . . .                | 437.50                            |
| 6912 = 288 = 192 = 96 = 12 = 1 small pound . . . . . | 5250.00                           |
| 9216 = 384 = 256 = 128 = 16 = 1 pound . . . . .      | 7000.00                           |

Other pounds containing more ounces are in use in different places and trades, as that of raw silk, which contains 24 oz. but the common lb. is used to weigh the articles, and the weight is then reduced. In like manner the Roman government allowed the merchants for waste, in paying custom duties, 20 oz. to the lb.; so that the 100 lb. or centenarius was 120 common lb. It then lowered the allowance to 18 oz. to the lb.; so that the 100 lb. was 112 com. lb. and an half. The fraction is now omitted, and only 112 lb. is allowed, the 100 lb. of 20 oz. to the lb. is still in use in some parts of the country, or in particular trades.

The Saxon and Norman conquerors having introduced their native weights into our mints, this procedure obliged the gold and silver smiths to adopt the same, and the apothecaries, who are the only other tradesmen that use small weights, being incurious about them, from not having the same check as other dealers in their customers reweighing the articles, took up with those they found in the scale makers' shops for weighing coin; and thus the drams, scruples, and grains, of the avoirdupois weight are gone out of use; so much so, indeed, that the dram, scruple, and grain English, are now adjusted to the Troy ounce, and differ only from the dram and scruple apothecary, and the grain Troy, by having their value marked upon them in words at length, instead of the medical characters of the two former, or the dots of the last. Silk is now the only article sold by less than the quarter of an ounce avordupois, and is sold by what should be called



the adarme, a Spanish weight probably imported along with the article itself, and which is, in the common treatises on arithmetic, confounded with the dram, the school masters dividing the ounce into 16 drams instead of adarmes; and, of late omitting the mention of the drams, scruples, and grains English.

Although we have retained the Roman weight, we have considerably shortened the nomenclature of it, which was rather complicated; but as this nomenclature is used in Latin medical and chemical books, which are accurately written, it should be known to medical students. The sixteen oz. pound seems to have been called by the German name pondo, or the Greek mina; the 12 oz. libra or assipondium, and for every particular number of ounces they used a peculiar name, as, for 11 oz. they said *deunx*;—for 10, *dextans* or *decunx*;—for 9, *dodrans*;—for 8, *bes*, *bessis*, or *des*;—for 7, *septunx*;—for 6, *semis*, *semisses*, *semissius*, *selibra*, or *sembella*;—for 5, *quincunx*;—for 4, *triens*;—for 3, *quadrans libræ*, or *triunx*;—for 2, *sextans libræ*; and for 1 oz. simply *uncia*.

The common traders seem to have divided the ounce by the powers of two, into *semiunciæ*, *sicilici*, &c.; thus,

|   | Equivalent<br>weight in<br>Troy grains. |
|---|---|
| 1 <i>lens</i> or <i>primus</i> . . . . .                            | 0.76                                    |
| 18= 1 <i>quadrans drachmæ</i> . . . . .                             | 13.64                                   |
| 36= 2= 1 <i>dimidium drachmæ</i> . . . . .                          | 27.28                                   |
| 72= 4= 2= 1 <i>drachma</i> . . . . .                                | 54.57                                   |
| 144= 8= 4= 2= 1 <i>sicilius</i> , or <i>siclus</i> . . . . .        | 109.14                                  |
| 288= 16= 8= 4= 2= 1 <i>semiuncia</i> , or <i>assarius</i> . . . . . | 218.29                                  |
| 576= 32= 16= 8= 4= 2= 1 <i>uncia</i> . . . . .                      | 436.58                                  |
| 6912=364=192= 96=48=24=12=1 <i>libra</i> . . . . .                  | 5239.00                                 |
| 9216=712=256=128=64=32=16=1 <i>mina</i> or <i>pondo</i> . . . . .   | 6985.00                                 |

Another division of the ounce in common use with medical writers is into *sextulæ* and *scrupuli*; which latter were subdivided in imitation of the Attic weights.

|   | Equivalent<br>weight in<br>Troy grains. |
|---|---|
| 1 chalcos . . . . .                               | 1.13                                    |
| 8= 1 simplium, or obolus . . . . .                | 9.09                                    |
| 16= 2= 1 scrupulum, or gramma . . . . .           | 18.19                                   |
| 64= 8= 4= 1 sextula or sextans . . . . .          | 72.78                                   |
| 128= 16= 8= 2= 1 duella or bina sextula . . . . . | 145.56                                  |
| 384= 48= 24= 6= 3= 1 uncia . . . . .              | 436.58                                  |
| 4608=576=288=72=36=12=1 libra . . . . .           | 5239.00                                 |

The moneyers, and of course the assayers and metallurgic chemists, divided the ounce into denarii, libellæ, &c. and some of these divisions were taken, by particular dispensers of medicine, as nearer imitations of the Attic weights, ordered by the physicians, than the former.

|   | Equivalent<br>weight in<br>Troy grains. |
|---|---|
| 1 sextans libellæ, taken for the Attic chalcos . . . . .      | 1.04                                    |
| 1½= 1 quadrans libellæ, or teruntius . . . . .                | 1.56                                    |
| 6 = ¼ = 1 libella, as, or assarion . . . . .                  | 6.25                                    |
| 10 = 6½= 1½= 1 sextans denarii, or Attic obolus . . . . .     | 10.42                                   |
| 15 = 10 = 2½= 1½= 1 quadrans denarii, or sestertius . . . . . | 15.62                                   |
| 60 = 40 = 10 = 6 = 4= 1 denarius, or Attic drachma . . . . .  | 62.51                                   |
| 420 = 280 = 70 = 42 = 28= 7= 1 uncia . . . . .                | 436.58                                  |
| 3360 =2240 =560 =336 =224=56= 8=1 bes, or des . . . . .       | 3500.68                                 |
| 5040 =3360 =840 =504 =336=84=12=1 libra, or as . . . . .      | 5239.00                                 |

*Tower, or Saxon Weight.*—The next weight introduced by our ancestors, and which is still retained in use, is that known by the name of the Tower pound. From an old record it appears, that this pound counterpoised 11 oz. 1 qr. Troy, or 5400 grains. The exact correspondence of 8 ounces of this weight with the mark of Cologne, used in most of the German mints, shows that this pound is evidently the small pound of our Saxon ancestors, or that of the Easterlings, as being derived from Greece, through Thrace. Galen informs us, that 24 Greek litras were equal to 25 Roman libras, which is very nearly the proportion between this pound and the 12 ounce avoirdupois pound.

The reports of assayers refer to this small Saxon pound as the integer; that used in assaying gold, and formerly in weighing it, by pounds and mancuses, is thus divided: to which is added the counterpoise in Troy weight:

|  | Equivalent<br>weight in<br>Troy grains. |
|--|---|
| 1 Tower grain . . . . .                                    | 0.98                                    |
| 15= 1 quarter carath grain, or feorthling mancus . . . . . | 13.87                                   |
| 60= 4= 1 carath grain, or mancus . . . . .                 | 55.50                                   |
| 240= 16= 4= 1 carath, or loth . . . . .                    | 225.00                                  |
| 5460=384=96=24=1 Tower pound . . . . .                     | 5400.00                                 |

The subdivision of this weight by 4 and 4 shows to what nation it belongs, especially as all our neighbours on the continent divide the carath differently; some as the French into 32 thirty-seconds; others, as most of the German mints, into 12 grains, and these into 4 small grains. Analogy, then, leads us to infer, that the integral pound used in assaying silver refers to this weight, although being divided the same as the Troy, the integer is now supposed to refer to the pound of that weight; and the talent now called a journey (day's work), of silver is taken as 60 lb. Troy.

|                                     | Equivalent<br>weight in<br>Troy grains. |
|-------------------------------------|---|
| 1 Tower grain . . . . .             | 0.98                                    |
| 24= 1 peninga, or penny . . . . .   | 22.50                                   |
| 480= 20= 1 ora, or ounce . . . . .  | 450.00                                  |
| 5460=240=12=1 Tower pound . . . . . | 5400.00                                 |

These modes of division have survived to our time. Our ancestors not only divided this pound in other manners for ordinary use, but had also another pound, in more common usage, of 15 oz. like one of the Greek pounds; and moreover a Danish mark :

|   | Equivalent<br>weight in<br>Troy grains. |
|---|---|
| 1 Tower grain . . . . .   | 0.98                                    |
| 24= 1 peninga . . . . .   | 22.50                                   |
| 36= $1\frac{1}{4}$ = 1 mærra peninga, or bener peninga . . . . .                          | 27.75                                   |
| 60= $2\frac{1}{2}$ = 2 = 1 mancus, or drachma . . . . .                                   | 55.50                                   |
| 96= 4 = $3\frac{3}{5}$ = $1\frac{3}{5}$ = 1 smaelle skylling . . . . .                    | 90.00                                   |
| 120= 5 = 4 = 2 = $1\frac{1}{4}$ = 1 skylling . . . . .                                    | 112.50                                  |
| 384= 16 = $12\frac{4}{5}$ = $6\frac{2}{5}$ = 4 = $3\frac{1}{5}$ = 1 smaelle ora . . . . . | 360.00                                  |
| 480= 20 = 16 = 8 = 5 = 4 = $1\frac{1}{4}$ = 1 ora . . . . .                               | 450.00                                  |
| 2400=100 = 80 = 40 = 25 = 20 = 6 = 5=1 Danish marc . . . . .                              | 2250.00                                 |
| 5460=240 = 192 = 96 = 60 = 48 = 15 = 12=1 smaelle punda . . . . .                         | 5400.00                                 |
| 7200=300 = 240 = 120 = 75 = 60 = $18\frac{3}{4}$ = 15=1 punda . . . . .                   | 6750.00                                 |



Both the pounds were therefore divided alike into 15 ores, that is, ounces; the ores into 4 skyllings, the sicilici of the Romans, and the skyllings into 4 pence by the Saxons, while the Danes used the mark of 20 skyllings, and the skylling of 2 mancuses. As to the thrimsa and scaetta, they appear to be the skylling and penny of silver in a coined state, and hence their variable reduction to other sums rated in bullion, from the variations in the state of the coinage, for which a greater or less allowance was made.

Many commodities, after being weighed by the hundred weight and reduced to common lbs. have, in London, a decrement called trett taken off, namely, 4 lb. in 104 lb.; now this singular allowance is the difference between the Tower and avoirdupois lb.; 104 Tower lb. of 15 ores being equal to 100 avoirdupois lb. of 16 ounces. Hence it should seem, that when this decrement was first allowed, the Tower weight was used by the custom house and tackle porters of London, and that this decrement was taken off, for the purpose of reducing the weight to the Roman or avoirdupois weight used in the inland trade; but has since been continued, from habit, restricted to articles having waste, and its origin has been confounded by school masters unversed in real business with that of cloff and draught.

*Troy, or Norman Weight.*—The arrival of the Normans from France, brought in another weight now called Troy, the ounce of which is much heavier than that of either of the preceding, and hence seems to have given occasion to constant disputes between the Norman and English, and continual complaints of the English dealers using short weight; the falsity of which is evident from the accuracy with which the Roman avoirdupois has descended to us by mere customary usage. Indeed the general interest of society, and the individual honour of the scale makers, would alike resist an universal shortness of weight. This can only be adopted occasionally by a cheating tradesman endeavouring to get more profit than his neighbours by altering his weights after they come out of the manufacturer's hands.

In 1225, it was made one of the provisions of magna charta, that there should be only one weight, one measure, and one quarter of corn in the realm. By this weight the Norman lords unquestionably understood the French Troy weight, to which they and their agents were accustomed, though the people, no doubt, considered the avoirdupois to be that entitled to this distinction. In 1267, 51 Henry III. the first positive attempt was made to change the common weight into the Troy, under the name of the weight of as-size, and twenty of the silver pennies then current, being in good condition so as to counterpoise 32 grains of good wheat, were declared to be an ounce; from whence the other terms were thus deduced:

|   | Equivalent<br>weight in<br>avoird. oz. |
|---|--|
| 1 grain Troy . . . . .  | 0.0022                                 |
| 6= 1 <i>farthing penny of silver</i> . . . . .                                  | 0.0137                                 |
| 20= 1 scruple apothecary . . . . .  | 0.0457                                 |
| 24= $1\frac{1}{5}$ = 1 penny or denarius . . . . .                              | 0.0548                                 |
| 30= $1\frac{1}{2}$ = $1\frac{1}{4}$ = 1 <i>farthing penny of gold</i> . . . . . | 0.0685                                 |
| 60= 3 = $2\frac{1}{2}$ = 1 dram apothecary . . . . .                            | 0.1371                                 |
| 288= $14\frac{2}{5}$ = 12 = $4\frac{3}{4}$ = 1 shilling, or solidus . . . . .   | 0.6580                                 |
| 480= 24 = 20 = 8 = $1\frac{3}{4}$ = 1 ounce Troy . . . . .                      | 1.0968                                 |
| 3840=192 =160 =64 = $13\frac{1}{2}$ = 8=1 French mark . . . . .                 | 8.7744                                 |
| 5760=288 =240 =96 =20 =12=1 pound Troy . . . . .                                | 13.1616                                |

For the sake of calculation, the gold and silver smiths divide the grain Troy into 20 mites, the mites into 24 droits, the droit into 20 periots, and the periot into 24 blanks; which are employed like the parts, seconds, and thirds, used in the calculation of superficial and solid measure by cross multiplication.

As long as the pound of accounts was equal to the pound weight of silver, the shilling was more usually employed as the first division of the Troy lb. than the oz., which seems to have been restricted to the avoirdupois weight, as the name of ore was to the first divisions of the Saxon pound or Danish mark. When, however, the Sovereign, to pay his debts or supply present exigences, adopted the ruinous expedient of heightening the value of the coin above its real



weight, to make the money in his treasury go, for the moment, farther than it otherwise would, unmindful of the consequent diminution of his fixed annual revenue, the shilling was used to express, as at present, the first division of the debased money pound, and the ounce for that of the pound in weight.

Several other acts of parliament have been since made, at different periods, to abolish the auncel weight, and to substitute this French weight in its place. The name of Troy weight first occurs in 1414, 2 Henry V. but it was not until 1495, 12 Henry VII. that the assize weight was called Troy.

Nothing can more strikingly show the great difficulty of a government attempting to introduce a new custom upon the people, when neither the interest of the Sovereign in his revenue induces him to insist on its adoption, nor the convenience of the people in their petty every day concerns, leads them to voluntary obedience, than these abortive attempts of the Norman lords to oblige us to use this large ounce. The Sovereign himself disregarded the law in his mint for 300 years, until 1504; and is supposed then only to have adopted it to assimilate our coins to the Flemish, and thus facilitate the *intercursum magnus*, or grand treaty of commerce, entered into the year before with the Flemings, against the Hanse towns, which opened the foreign trade to our own capitalists, and enabled Elizabeth, some years afterwards, to expel the Hanse merchants, who were then the commercial tyrants of Europe, from the realm. The Sovereign, even now, disregards the law in the post office, customs, excise, and other offices of his revenue and household. And as to the people, although nearly 600 years are elapsed since the attempt began to be made, the gold and silver smiths, connected as they are with the mint, are the only persons who pay entire obedience; for as to that of the apothecaries, it is but partial. It was probably some feeling of respect for the nation, or a desire of popularity, that induced Elizabeth to have the *avoirdupois* standards in the Exchequer made by her prerogative; but these weights have never received the sanction



of parliament; and the attempt to oblige the English people to use this French weight, instead of the national weight, is not yet relinquished.

When the London College of Physicians published, in 1618, their first pharmacopœia, Sir Theodore Turquet de la Mayerne, who compiled the work, being a French physician, unacquainted, as it should seem, with the usage of England, and not aware or regardless of the practical inconvenience of apothecaries buying and selling by one weight and making up their articles by another, ordered them to dispense their medicines by the Troy weight, instead of the avoirdupois, by which they buy and sell, and which had been previously used in dispensing. In order to avoid the expense of both piles, or the trouble of calculating how many oz. of one pile are equal to so many of the other, a strange mixture of the two are used. When medicines are ordered in quantities less than a quarter of an ounce, it is presumed that they are powerful in their action, and they weigh them by the Troy weight; but those ordered in a large proportion, being thought to be weak, or intended to be divided into numerous doses, the apothecaries presume that the difference between the two weights will not be of any consequence, and weigh them by the avoirdupois, which they are obliged to keep for their retail business as low as the qr. oz. Thus a trade in which the utmost precision in weights is usually expected, is actually that which is the most inaccurate in that respect; but—the patients have no means of checking errors in dispensing. Some few apothecaries and other dispensers have Troy weights as far as 4 or 8 oz. but scarce any have them heavier. The physicians, who, from want of an academical education, or any other cause, practise their profession under the mask of being apothecaries, that is to say, mere sellers of medicine, are at least as inaccurate; and many of them exhibit their medicines by the eye alone, without weighing. Dr Powell, in his translation of the last pharmacopœia, has desired, in a half-official manner, that no avoirdupois weights should be kept in an apothecary's shop; but that, like the

gold and silver smiths, they should buy and sell, as well as dispense, by the Troy weight. He does not consider, that gold and silver are articles bought and sold by that weight, whatever may be the quantity; whereas, the medicines of the apothecary are, in general, only a specific appropriation of articles far more commonly used for other purposes; hence he must buy them by the usual commercial weight, and to forbid him the keeping of that pile in his shop, would deprive him of the power of checking the weight of the drugs sent in by his druggist, who, in the event of any dispute, would not rely on the reduction that might be made by the apothecary of one weight into another. On the other hand, to oblige him to sell by a weight the ounce of which is much heavier than the common, would necessitate the asking of a higher price, by 10 per cent. than the druggist, or a diminution of the profit to the same amount. All this confusion and inaccuracy has arisen from the national vanity of Sir Theodore Mayerne, which led him to suppose that the weight of Troyes in Champagne, must be superior to that of the *barbares* of England; and his ignorance, that those English weights that he despised, were the very weights used by the Greeks and Romans in composing those prescriptions that he selected. The only method to get rid of this confusion would be for the College to disclaim this absurd introduction of the French weight, to return to the national weight, and thus restore the use of its small divisions.

*Foil Weight.*—Besides these weights affecting all, there is another pound, called the lb. foil, which weighs one fifth less than the lb. Troy. It was used to weigh gold and silver wire, foil, and jewels; and its smaller divisions are still used by the jewellers to weigh diamonds, pearls, and precious stones. As the pound is nearly similar in its content to that of Venice, which counterpoises 4656 Troy grains, and the articles for which it is used were formerly imported from thence, it probably came with them; but the ounce was divided into pennies, instead of sextules, as in the original weight.



|                                     | Equivalent<br>weight in<br>Troy grains. |
|-------------------------------------|---|
| 1 sixteenth                         | 0.05                                    |
| 16= 1 jeweller's grain              | 0.80                                    |
| 64= 4= 1 jeweller's carat           | 3.20                                    |
| 404= 24= 6= 1 penny foil            | 19.20                                   |
| 7680= 480= 120= 20= 1 ounce foil    | 384.00                                  |
| 92160=5760=1440=240=12=1 pound foil | 4608.00                                 |

The carat of this weight signifies the seed of the kurua tree, whereas the carath of the Tower lb. is an Egyptian word significant of the 24th part of any thing, and is applied in Egypt to the provinces of that land, or the wards of its larger cities, in the same manner as the Latin uncia is used for the 12th part of any integer whatever. As the jewellers mostly deal also in silver and gold, and are therefore obliged to keep the Troy weight, they now use that pile to weigh their jewels, but reckon, of course, 150 carats for an ounce. The sixteenths foil, which are equal to the mites of the gold and silver smiths, are sometimes divided again into quarters, which are the smallest weights used in commerce. Some authors assert the Troy ounce to counterpoise 152 carats 3 grains, and, of course, the carat to be equal to 3.162 gr. Troy.

*Foreign Weights.*—These four pounds, namely, the avoirdupois, Tower, Troy, and foil, are the only weights used in England; but as the works of the French and German chemists are frequently translated, some knowledge of their weights is necessary.

The French weight in actual use is thus divided:

|  | Equi. wt.<br>in<br>grammes. | Equi. wt.<br>in<br>Troy grs. |
|--|-----------------------------|------------------------------|
| 1 grain  | 0.530                       | 0.82                         |
| $7\frac{1}{5}$ = 1 <i>felin</i>                                      | 0.382                       | 5.90                         |
| $14\frac{4}{5}$ = 1 <i>maille</i>                                    | 0.764                       | 11.81                        |
| 24 = 1 <i>denier</i> , or <i>scrupule</i>                            | 1.274                       | 19.69                        |
| $28\frac{4}{5}$ = $1\frac{1}{5}$ = 1 <i>esterlin</i>                 | 1.529                       | 23.62                        |
| 72 = 3 = $2\frac{1}{2}$ = 1 <i>gross</i> , or <i>dragme</i>          | 3.824                       | 59.07                        |
| 576 = 24 = 20 = 8= 1 <i>once</i>                                     | 30.598                      | 472.56                       |
| 4608 = 192 = 160 = 64= 8= 1 <i>marc de Charlemagne</i>               | 244.787                     | 3780.56                      |
| 6912 = 288 = 240 = 96= 12= 1 <i>livre</i> , <i>poids de medecine</i> | 367.180                     | 5696.75                      |
| 9216 = 364 = 320 = 128= 16= 1 <i>livre</i> , <i>poids de marc</i>    | 469.574                     | 7561.00                      |



The French philosophers, for parade, have vapoured much of a new weight to be deduced primarily from an admeasurement of a degree of the earth's surface. The initial weight to be called a gramme, from whence the other terms are deduced decimally.

|                    | Gramme. | French grains. | Troy grains. |
|--------------------|---------|----------------|--------------|
| Myriogramme . . .  | = 10000 | = 188224.66    | = 154440.23  |
| Chiliogramme . . . | = 1000  | = 18822.46     | = 15444.02   |
| Hecatogramme . . . | = 100   | = 1882.24      | = 1544.40    |
| Decagramme . . .   | = 10    | = 188.22       | = 154.44     |
| Gramme . . .       | = 1     | = 18.82        | = 15.44      |
| Decigramme . . .   | = 0.1   | = 1.88         | = 1.54       |
| Centigramme . . .  | = 0.01  | = 0.18         | = 0.15       |
| Millegramme . . .  | = 0.001 | = 0.018        | = 0.015      |

Although the new chemical books in French nominally use the gramme, yet in all their processes for practical purposes, it will be found that they are mere reductions of the common weight to the decimal scale, so that the new metrical system has only mystified, to use a French term for hoaxing, the students, and produced a similar discrepancy between books and the laboratories, as the new nomenclature has produced, in many instances, between books and the shops. Indeed their government has lately given up the point, and allowed the use of the old pound, ell, &c. only ordering them to be divided decimally, as is done in England with long measures, whenever convenience requires it, without any coercion.

In regard to the German weights, the common pound varies in almost every state, but the chemists generally employ the Cologne mark weight, or the medical pound of Nuremberg, as being in the most general use.

The Cologne mark weight is thus divided :

|   | Equivalent weight in Troy grains. |
|---|-----------------------------------|
| 1 as, or esche . . . . .                            | 0.83                              |
| $8\frac{1}{2}$ = 1 heller . . . . .                 | 7.05                              |
| 17 = 1 pfenning . . . . .                           | 14.11                             |
| 68 = 4 = 1 quintlein, or dram . . . . .             | 56.44                             |
| 272 = 16 = 4 = 1 loth . . . . .                     | 225.76                            |
| 544 = 32 = 8 = 2 = 1 unzen . . . . .                | 451.52                            |
| 4352 = 256 = 64 = 16 = 8 = 1 mark . . . . .         | 3612.20                           |
| 6526 = 384 = 96 = 24 = 12 = 1 pfund . . . . .       | 5418.30                           |
| 8704 = 512 = 128 = 32 = 16 = 1 mark pfund . . . . . | 7224.40                           |

In calculations, the pfennings are divided into 256 richt-pfenning-theilen.

Pharmaceutical writers generally use the medical lb. which is divided into ounces, drams, and scruples, like our own; the ounce being equal to 469 Troy grains.

The Swedish common lb. is equal to 6556 gr. Troy, and is divided into 32 lods, or half ounces of 4 drams each.

*Subtle Weights.*—For experimental purposes, the pound or other integral weight is taken either by custom, or at pleasure. Thus, for assaying silver to discover its fineness, six grains are customarily taken for a Tower pound, which is divided as low as the half penny weight, whose real weight is the 80th part of a grain; so that the fineness of silver is estimated to the 480th part of the mass. For assaying, six grs. Troy are in like manner taken for a Tower pound, and divided as low as the quarter grain, whose real weight is the 64th part of a gr. Troy; for the fineness of gold, although it be about 14 times more valuable than silver, is estimated, in England, only to the 384th part of the mass, but in France, to the 768th, and in Germany to the 1152dth. Twelve grains are usually sent, originally that two simultaneous experiments might be made, the accordance of which would show that no error was committed; but most English assayers now use the whole in a single trial. For assaying ores a dram is usually taken, and is called an hundred weight, and divided into pounds, ounces, and half ounces; so that, if it be the stannery weight of six score pounds to the cwt. each lb. is represented by half a grain Troy, the ounce by the 32dth of a grain, and the half ounce by the 64th of a grain. In all these kinds of subtle or assay weights, the artists have sets adjusted with the utmost exactness and stamped with the fictitious value in order to avoid the trouble of calculation. The real weight of the fictitious pounds used by Lavoisier in his experiments was frequently different: he pretends to have divided them decimally to five or six places of figures; but these fractions are certainly the mere result of calculation, and quoted only for parade and



deception, as no practicable means exist of determining weights to that minute exactness. He confesses, indeed, c. iii. that in relating experiments, he gives the combined results of several in a single detail, a circumstance which in like manner greatly diminishes their authenticity and value. The English experimental chemists usually employ 100 grs. Troy, each of which they divide into tenths and hundredths; and if 100 grs. cannot be employed in their experiments, they generally calculate the results as they would be if that weight had really been used.

*Pile of Weights.*—A pile of weights is usually so formed that each weight, except the first, is the half of that next above it: but this is sometimes not the case. Each of the standard suites of weights in the Exchequer consists of two parts, which will serve to show their construction. The bell shaped avoirdupois suite consists of seven pieces: namely, the half cwt. or 56 lb.; the quarter cwt. or 28 lb.; the half quarter cwt. tod, horseman's stone, or 14 lb.; the 16th of a cwt. clove, or 7 lb.; a weight of 4 lb. 2 lb. and 1 lb.; in all forming 112 lb. or a whole hundred of five score and twelve. The other avoirdupois suite is a flat pile of a butcher's stone or 8 lb. weight, one of 4 lb., 2 lb., 1 lb., half a lb., a quarter of a lb., a half quarter lb. or 2 ounces, the 16th of a lb. or 1 ounce, half an ounce, a quarter of an ounce, a half quarter of an ounce, and two 16ths of an ounce, in all forming 16 lb. These two suites cost Elizabeth £6. 0s. 10d. The Troy suite has first a hollow or cup pile, the outer case of which weighs 256 ounces: then a weight of 128, 64, 32, 16, 8, 4, and 2 ounces; then one of a single ounce, half an ounce, a quarter of an ounce, a half quarter of an ounce, and 2 pieces called farthing gold weights or 16ths of an ounce; in all 14 pieces, weighing together 512 ounces, or 48 lb. 8 ounces. Secondly, an ivory box of small weights: namely, one of an ounce or 20 dwts., half an ounce or 10 dwts., a quarter of an ounce or 5 dwts., one of 4 dwts., 3 dwts., 2 dwts., 1 dwt. or 24 grains, half dwt. or 12 grains, a farthing silver weight or 6 grains, one of 4, 3, and 2 grains, and a single grain; in all



13 pieces. The whole Troy suite cost originally £3. 8s. 1d. but the ivory box seems to be lost, for Graham says, there are no weights in the Exchequer that are standards for grains. The accuracy of a pile is examined, by counterpoising each weight with so many of the smaller as are necessary; and the goodness of the pile for commercial purposes, is shown by reference to a legal standard pile, or by weighing a determinate number of new coin, and observing whether the weight, as found by the balance, agrees with what it ought to be by calculation.

*Subtle Piles.*—Experimental chemists usually make their own weights, or at least adjust them; and this is done, either by repeatedly doubling an initial weight, or halving it: in the former method, an error being once committed goes on increasing rapidly, therefore the latter mode is usually fixed upon. The initial weight is first chosen, which, though not absolutely necessary, yet is most convenient when it may be halved several times without requiring a fractional expression, and is of some certain commercial value, as 64 or 128 lb. ounces, or grains. If the latter be chosen, two dishes of copper, glass, or blued steel, are then put into the pans of an equal armed balance, and exactly counterpoised by filing or grinding off on a grindstone or hone that which is the heaviest, until they are rendered exactly of the same weight. In one of these dishes is put the initial weight, and in the other powdered tin, or dry white sand previously well washed, in sufficient quantity to counterpoise it: the final adjustment being made with a parcel of rings of fine silver wire, formed by rolling the wire very close round a piece of thick wire, and then drawing a knife along the fine wire the whole is cut into rings of equal size, the which rings ought to be such that one of them will just sensibly affect the balance when empty. The two dishes are then taken out of the scales, and placed on a very smooth black painted board, situated between the light and the eye. The initial weight is then laid by, and, by means of a spoon and forceps, the tin powder is distributed as equally as possible between the two dishes, ob-

serving to put nearly all the adjusting rings into one of the dishes. The dishes being replaced in the pans of the balance, if they be not of equal weight they are taken out again, placed on the black board, and so much as is judged necessary of the tin powder is taken out of the heaviest and placed in the lightest dish. They are then replaced in the balance, and if not equiponderant the process must be repeated until both the dishes are of equal weight: the whole being an excellent trial of the experimenter's patience. The tin powder is then to be taken out of that dish which contains the fewest rings, and a bit of brass or silver of the proper shape, and nearly the same weight, but rather too heavy, is placed in the emptied dish, and by repeated weighings and filings is reduced to the proper weight; the final adjustment being made by rubbing it a stroke or two on a fine hone, as a file might take off too much and entirely spoil the weight. The weight piece thus obtained is to be laid upon the tin powder in the other dish and counterpoised with the initial weight, as a proof of the correctness of the operation, and a means of discovering whether any portion of the tin powder has been lost in spite of every precaution, and of course the whole labour been taken in vain. This being accomplished, the tin powder in the dish is to be divided in like manner into two equal parts as before, and the process of making a weight piece repeated until the smallest weight sensible by that balance is obtained: each weight being examined as it is formed, first with the one immediately preceding it, and secondly the whole set with the initial weight. For very small weights, jewellers' foil, having the colour washed off with warm water and then dried, is a good material. A few peculiar weight pieces of frequent use may be made and kept in readiness, by adding two or more weights together and forming a third from them, as those for 100, 50, 25, 12, 6, and 3 unities of weight, be they of what denomination they may. Some increase by ones up to 10, then by tens up to 100, then by hundreds up to 1000; which, it appears, from the nummulary system of the Romans, was in use



*Metaleuca Canipati*



*Metaleuca Leucodendron*







with them; and this is a good method: although more expensive at first, it saves time afterwards when several weights come to be added. Some have attempted to shorten the labour of forming a pile of weights, by first counterpoising the initial weight with wire of a proper size, and then, after measuring it carefully, by calculating and cutting off by measure the counterpoises of the intended pile. Although this may do for common purposes, yet when extreme accuracy is required, the other method will have the preference. It is indeed so difficult to assize a suite of weights, that it would seem necessary, in actual business, to allow that if the whole pile taken together is accurate a small discrepancy in the subdivisions should not vitiate the use of it, provided that this remedy, as it is called in the mint, should not exceed the — part of the weight in any one piece, nor defect be peculiar to those pieces that are in most frequent use.

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*On the Specific Differences existing between Melaleuca Cajuputi, and M. Leucadendron. By the late William Roxburgh, M.D. F.R.S.E. and Henry Thomas Colebrooke, Esq. F.R.S. Dir. R.A.S. Accompanied by two Plates.*

As one of the principal objects of the Medico-Botanical Society is to ascertain correctly the different vegetables, the products of which are enumerated as medicines in the catalogues of the materia medica of all nations; it will be useless to offer an apology for drawing its attention to the subject abovementioned, which it is hoped will, through the high authority of Sir James Edward Smith (whose recent loss the botanical world has so severely felt), Drs Roxburgh, Maton, and Fleming, and Mr Colebrooke, establish beyond a doubt the specific differences that exist between the ME-

LALAUCA *Cajuputi* and *M. Leucadendron*; and it is with confidence I trust that the mere mention of the names of those illustrious botanists will induce the Society to make known to the public at large, the facts which are here detailed, particularly as no correct engravings of these plants have ever been published.

The description of *M. Cajuputi* was kindly furnished me by H. T. Colebrooke, Esq., from the MS. of Dr Roxburgh, No. 2139, and the same gentleman has communicated to the Society the drawing of that plant, made under the superintendence of Dr Roxburgh. The description of *M. Leucadendron* is from the pen of Mr Colebrooke, under whose direction the Botanic Garden at Calcutta was left by Dr Roxburgh at his departure from India, during which period the drawing of this plant, as well as of many others, was executed.

JOHN P. YOSY,  
Secretary.

#### POLYADELPHIA POLYANDRIA.

MELALEUCA. *Calyx* five parted—semi-superior. *Corol* five petalled. *Stamina* (about 45) very long, conjoined in five bodies. *Style* single. *Capsule* three celled. *Seeds* numerous.

*M. Cajuputi*.\* Pharm. Lond. 1809. (Vide *Plate* 1.) *Branchlets* pendulous. *Leaves* alternate, short, petioled, narrow-lanceolate, three and five nerved. *Spikes* terminal and axillary, comose, villous. *Bractes* lanceolate, three flowered.

*Arbor Alba Minor*. Rumph. Amb. 2, p. 76, tab. xvii. fig. 1. *Cajuputi*, *Dawn-Kitzjil*, and *Kaju-Kilan* of the Malays.

\* With the compilers of the Pharmacopœia of the Royal College of Physicians of London for 1809 I agree, in supposing that the essential oil, called *Cajuputi*, is prepared from the leaves of the smaller MELALEUCA, called by Rumphius *Arbor Alba Minor*, and also that this tree is specifically different from his *Arbor Alba Major*. Herb. Amb. 2, p. 72, tom. xvi. (MELALEUCA *Leucadendron*.) But I think the trivial name *Cajuputi*, which they have given to this species, may lead to a wrong conclusion, because that Malay appellation is more directly that of *Arbor Alba Major*. Roxb.



This elegant, useful, and small tree is a native of the the Molucca Islands; and as it is from its leaves that the valuable medicine called *Cajuputi oil* is obtained, it became an object of importance to try if it would grow in *Bengal*, where the medicine is frequently used with the best success. During my absence at the Cape of Good Hope, on account of bad health, in 1798, Dr John Fleming had charge of the Botanic Garden. At the same time, Mr Smith, the nurseryman, was employed on the Molucca Islands, collecting plants for the garden, consequently an excellent time for obtaining growing plants of the tree. Dr Fleming therefore gave Mr Smith strict orders to be very careful to get the proper sort (two or three being mentioned by Rumphius) from which the best oil was obtained. This commission Mr S. executed to our satisfaction; many thriving plants having been sent to the garden by the close of the year, where they continued to grow freely; and in six or seven years they began to blossom at various times of the year, which they have hitherto continued to do, and to ripen their seeds perfectly. From them numerous plants have been reared, and not only distributed over many parts of the continent of India, but sent to various other quarters of the world. It is from the original young trees, now (1811) thirteen years old, that the following description and the accompanying figures\* are taken.

*Trunk* tolerably erect, but crooked, and slender for the age of the trees: *Bark* of a very light or whitish ash colour, soft, thick, and spongy, pretty smooth on the surface, and the exterior lamina peels off from time to time in thin flakes like the birch tree; and the interior bark may be separated into numerous lamina, like the leaves

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\* These figures are now in the collection of the honourable East India Company.

of a book. *Branches* scattered with the slender twigs, often drooping, as completely as in the weeping willow; they are round and smooth; *young shoots* sericeous; height of the young trees (thirteen years) above mentioned about twenty feet, and the thickest part of the trunk not more than a man's leg, including the bark, which is three-quarters of an inch thick.

*Leaves* alternate, project in every direction, short petioled, narrow lanceolate; while young, sericeous; when full grown, smooth deep green, three and five nerved, sometimes slightly falcate; entire length, from three to five inches, and from half to three-quarters of an inch broad; on being bruised, they smell strong of the substance they yield, yet the cells which contain this aromatic fluid are scarce visible in the fresh leaves.

*Spikes* terminal, and from the extreme axils, downy; while in young flowers there is only a scaly cone at the apex: which soon advances into a leafy branchlet.

*Bractes* solitary, lanceolate, sericeous, three-flowered, caducous.

*Flowers* tern, sessile, small, white, inodorous.

*Calyx* urceolate semi-superior, sericeous. *Margin* of five semi-lunar deciduous segments.

*Petals* five, orbicular, short-clawed, white, greatly longer than the segments of the calyx.

*Filaments* from thirty to forty, united into five portions at the base, three or four times longer than the petals, and with them insected into the large villous five-lobed rim of the calyx, alternate with its segments. *Anthers* ovate-cordate, with a yellow gland on the apex.

*Germ* ovate, united to the calyx, three-celled; with numerous *ovula* in each, attached to an elevated receptacle in the inner and lower angle of each cell. *Style* rather longer than the stamina. *Stigma* obscurely three-lobed.

*Capsule* completely enveloped in the thick fleshy gibbous permanent tube of the permanent calyx, three-lobed;

three-celled, three-valved. *Valves* thin, hard, and elastic, opening from the apex. Partitions contrary. Receptacles triangular, thin, flat, lodged in the inner and lower angle of the cell.

*Seeds* numerous, regularly wedge-shaped.

It is readily cultivated both by the root and seed. When by the root, slender pieces thereof cut into little bits and laid horizontally in the earth during the rainy season, soon produce plants.

From the leaves is distilled the beautiful green, aromatic, camphorate, essential oil, called by the Malays at Amboyna, where it is chiefly made, *Cajuputi*, from *Cajuputi*, one of the Malay names of the tree.

When this tree was received into the Botanic Garden, and for the first five or six years afterwards, I was inclined to think it *Arbor alba major*, *Rumph.* Amb. 2, t. 16, on account of its very rapid growth during that period, as well as because it was then generally understood that the essential oil *Cajuputi* was obtained from that tree. But for these last six or seven years, the growth of several trees has been so slow, though in perfect health, flowering, and ripening abundance of fertile seed, at all seasons of the year, as to induce me to waver in my former opinion, and become rather inclined to consider it *Arbor alba minor* of the same author. This idea was encouraged by finding our trees agree in most respects better with Rumphius's description of the latter than with the former, and particularly because he says that an essential oil is obtained by distillation from the leaves of this small sort, but makes no mention of any such oil being procured from the large species. These conjectures have received additional support, I may say confirmation, from the Pharmacopœia above quoted. The following is a copy of Dr Powell, the translator's note, on the subject.

"This oil was supposed to be the produce of the '*MELALEUCA Leucadendron*,' but it appears from the specimens of the tree yielding the true *Cajuputi*, sent home by Mr Christopher Smith, that the species is different, and referable to



tab. 17th of Rumphius's Herbarium Amboinense, (vol. ii.) and not to that author's *Arbor alba* 16. After a careful examination of specimens in Sir Joseph Banks's, and other collections by Dr Maton, and in those of the Linnæan Herbarium by Dr Smith, we are authorized to consider the tree which yields the above oil as a new species, and from the name of its medicinal product, those gentlemen have agreed to give it the appellation of *MELALEUCA Cajuputi*."

As there are two figures in the 17th table of Rumphius, Dr Powell should have specified which of the two is meant, but I take for granted that it is the first.

*MELALEUCA Leucadendron*. Willd. (Vide *Plate 2*.)

*Arbor alba*. Rumph. Amb. 2, tab. 16.

*Leaves* alternate, dependent, lanceolate, acute five-nerved. *Spikes* axillary and terminal, interrupted, comose. *Bractes* lanceolate, three-flowered.

Introduced from the Moluccas (of which it is a native) by Lieut. Mackenzie, into the Botanic Garden at Calcutta, in 1810, and flowered in September 1813, the tree being about nine feet high.

*Trunk* erect, slender.

*Bark* white, smooth, soft, thick, spongy, lamellated, flaking.

*Branches* scattered, patulous, young shoots smooth.

*Leaves* alternate, short petioled, dependent, lanceolate, acute, oblique or falcate, smooth, five-nerved, entire, from four to five inches long, three-quarters of an inch broad (inodorous when bruised).

*Petioles* laterally recurved.

*Stipules* at the base of the branchlets imbricate, lower ones ovate, upper ones linear-lanceolate, caducous.

*Spikes* axillary, terminal, comose.

*Flowers* tern, sessile, white, inodorous.

*Perianth* semi-superior (tubular with urceolate border) smooth, five-toothed, persistent. *Teeth* obtuse.

*Petals* five, orbicular. Claws short.

*Filaments* numerous, (thirty, thirty-five) united into five parcels at the base much longer than the petals, inserted on the rim of the calyx.

*Anthers* subglobular, incumbent.

*Germ* ovate, closely invested in the lower part by the tube of the calyx, three-celled, with numerous ovula in each cell.

*Style* longer than the stamina. *Stigma* three-cornered.

*Capsule*                   \*                   \*

Differs from *M. Cajuputi* in the smoothness of every part of the plant, a more interrupted spike, and broader and more oblique leaves.

The following is the partial account of the same plant, which he did not live to see flower, given by Dr Roxburgh in the 4th vol. p. 754, of his intended *Flora Indica*, now publishing in India by Drs Carey and Wallich.

"*MELALEUCA Leucadendron*. Willd. 3, 1428. Smith in *Trans. Lin. Soc.* 3, 274.

"*Leaves* alternate, vertical, lanceolate, more or less falcate, five-nerved, tender part smooth.

"*Arbor alba*. Rumph. Amb. 2, t. 16.

"This species was only introduced into the Botanic Garden in 1810, whereas *M. Cajuputi* has been there since 1797. The plants of the former are still small, nor can they be expected to blossom for some few years to come, their growth is scarce so rapid as that of *Cajuputi*. In habit, plants of the same age are very much alike, but the leaves of this species are larger, more falcate, and possess little or no fragrance when bruised, nor can I discover that they are even employed in the distillation of the *Cajuputi* oil. To these obvious marks of distinction in the young trees, I may add, that all the most tender shoots, leaves, &c. are here perfectly smooth, while in *Cajuputi* they are sericeous."—*Trans. Lond. Med. Bot. Society*.

*On the Preparation of the Iodides.*

The confidence that is already reposed in the efficacy of iodine as a remedy, and the frequent demands made upon the apothecary for its different preparations, render it necessary that he should not only keep them in his shop, but that he should be more or less familiar with the processes by which they are formed. In the *Journal de Pharmacie* for August 1828, we find a memoir by M. Henry, chief of the central pharmacy, giving directions for preparing several of the iodides; and we cannot but believe they will be acceptable to many of our readers, as they are rules not to be met with in the ordinary works, and are employed in the composition of these substances in the central pharmacy of Paris.

*Iodide of Sulphur.*

M. Henry states, that not having met with the analysis of this compound in the beautiful work of M. Gay Lussac on iodine, he supposed that, from the striking analogy which exists between iodine and chlorine, and their compounds, this ought to be of the same atomical proportion as the chloride of sulphur: which is formed of

1 atom of sulphur,  
2 atoms of chlorine.

By substituting iodine for chlorine we have

|                   |       |          |
|-------------------|-------|----------|
| 1 atom of sulphur | . . . | 201.16,  |
| 2 atoms of iodine | . . . | 1561.94. |

The atom of iodine represents one volume.

One hundred parts of sulphur will require 776.5 of iodine. But as the iodine is always volatilized in small quantities during the fusion to which the mass is necessarily subjected for the purpose of accomplishing the union, it is best to use 900 parts of this substance to 100 of sulphur.

As it was suggested by some pharmaciens, that the quantity of iodine in this preparation was too large, M. Henry



tried it with several others, which it is unnecessary here to repeat. The proportions he finally adopted are,

|         |      |
|---------|------|
| Sulphur | 100  |
| Iodine  | 800. |

These are to be well mixed and introduced into a vial closed with a cork, or surmounted by a tube drawn out by a lamp, in order that the smallest possible quantity of iodine may escape. It is to be placed on a sand bath until the whole is in complete fusion, when it is to be withdrawn and suffered to cool. The iodide obtained by breaking the vial presents the following characters: it is in mass, of a greyish black; of a radiated structure; sometimes lamellated, having the odour of iodine, and possessing all the characters assigned to it by Gay-Lussac, Thenard, Thomson, &c. It is proper to observe in the preparation of this substance, that it ought not to be continued in a fused state a long time, or it will decompose, as has been indicated already by Gay-Lussac.

*Iodide of Potassium—Hydriodate of Potash.*

Our associate, M. Caillot, has published a process generally adopted in the works of chemists. Without wishing to change any thing in the main, we have thought it proper to report the formula followed at the Central Pharmacy, although it may be the same with some modifications.

|                                   |               |
|-----------------------------------|---------------|
| R.—Iodine                         | 1000 grammes. |
| Filings of Iron                   | 300           |
| Sub-carbonate of Potassa purified | 1000          |
| Distilled water                   | 5000          |
| Product                           | 1200          |

Put the iodine into a porcelain vase, and dilute it with the quantity of water indicated. Afterwards add the iron filings, agitating it with a tube. If proper care be not observed, when the water is added to the iodine, so much heat will be disengaged as in great part to volatilize this substance and endanger the breaking of the vessel. It is there-

fore best to place the vase in a "*terrene*," to avoid the consequence of a fracture.

The mixture presents at first a yellow colour on the edges of the vessel, which gradually deepens, and finally assumes a reddish appearance. The violet vapours that will be seen to escape, are owing to a small quantity of iodine that remains uncombined. To complete the combination, the mixture must be placed on a sand bath, and heated until the liquid acquires a greenish tinge; it is then to be filtered, and the deposit of uncombined iron well washed. Finally, dissolve the potassa in a sufficient quantity of distilled water; filter and add to the above solution. The liquor ought to be slightly alkaline, and not to be precipitated by the further addition of water of potassa. The whole mixture is then left in an evaporating dish for five or six days; care being observed to agitate it from time to time, in order that the iron may assume the form of the tritoxide, which is recognised by the deposit becoming of a reddish colour. In this state the decantation is easy. The liquor is to be filtered; the precipitate washed with distilled water; and the whole reunited, and evaporated in a porcelain vessel, until a pellicle forms on the surface, from which perfectly pure crystals of a cubic form may be obtained.

#### *Iodide of Barium.*

|                         |              |
|-------------------------|--------------|
| R.—Iodine               | 100 grammes. |
| Filings of iron         | 36           |
| Sub-carbonate of baryta | 150          |
| Product                 | 100          |

Form an iodide with the iodine and iron, after the preceding formula for hydriodate of potassa. Then decompose a solution of muriate of baryta (200 gram.) by a sufficient quantity of sub-carbonate of soda, in order to procure the carbonate of baryta. Filter this mixture, and when the washed magma is in a pasty or gelatinous consistence, dry 10 grammes of it in a crucible, to ascertain what quantity of

dry carbonate is represented by this weight. Then take a portion of this hydrated carbonate of baryta, that will correspond to 150 grammes of the dry, and dissolve it in the solution of hydriodate of iron. Put the whole into a capsule, and heat it on a sand bath for three or four hours, frequently stirring it; when remove, filter and evaporate to dryness, if the salt in the form of crystals is not desired. If the capsule be withdrawn from the fire when the surface begins to be covered with a pellicle, and suffered to cool slowly, we may obtain by decantation tolerably fine needle-shaped crystals, resembling in appearance those of hydrochlorate of strontian. It is proper to observe, that these crystals ought not to be dried on paper, since the starch contained in the latter is sufficient partially to decompose them. The paper becomes coloured at the same time that the salt is decomposed.

The iodide of barium is white and crystalline; by degrees it decomposes in the air, and therefore requires to be preserved in well stopped bottles.

This iodide may be prepared with the hydriodic acid, and the carbonate of baryta; but this mode would be more tedious and expensive.

*Iodide of Calcium.*

|                 |              |
|-----------------|--------------|
| R.—Iodine       | 200 grammes. |
| Filings of iron | 50           |
| Slaked lime     | 85           |
| Product         | 170          |

Follow the same process as that indicated for the iodide of barium, if the carbonate of lime is not employed; but simply the lime slaked and passed through a sieve.

*Iodide of Iron.*

|                 |              |
|-----------------|--------------|
| R.—Iodine       | 100 grammes. |
| Filings of iron | 30           |
| Product         | 100          |

Follow the process directed for the iodide of potassium. Evaporate the solution of hydriodate of iron to dryness, as



it crystallizes with difficulty, owing to its great affinity for the moisture of the atmosphere.

### *Iodide of Mercury.*

The preparations given in the following formula are different from those published in the eighth volume of the *Journal de Pharmacie*.

### *Proto-iodide of Mercury.*

|                          |              |
|--------------------------|--------------|
| R.—Hydriodate of potassa | 565 grammes. |
| Proto-nitrate of mercury | 1245         |
| Product                  | 1000         |

Dissolve the proto-nitrate in a sufficiently large quantity of distilled water, observing to add a small quantity of nitric acid to the water to facilitate the solution of the salt. Then dissolve the hydriodate of potassa in a sufficient quantity of distilled water, taking care that the solution may be slightly alkaline, without which the acid, necessarily added in the other solution to increase the solubility of the nitrate, will form the deuto-iodide; and even, notwithstanding this precaution, it will always form towards the end of the operation. Now, add by small portions at a time the solution of the proto-nitrate to that of the hydriodate: the precipitate, which follows, is at first blackish, but it assumes a greenish yellow by a fresh addition of the mercurial solution. Continue to add the latter until a slight red precipitate follows, indicating the formation of the deuto-iodide. At this moment put in a slight excess of the hydriodate of potassa, a portion of the solution of which must be retained for this purpose. Suffer it to rest; decant, wash the precipitate, and then dry it.

Reunite the mother and the wash-waters, and pour on them sufficient of the proto-nitrate exactly to produce saturation; because the ioduret is soluble in either of these solutions. Then decant, wash, and partly dry the product, which, if it betrays by its colour no deuto-iodide, may be mixed with the first parcel.

*Deuto-iodide of Mercury.*

|                           |              |
|---------------------------|--------------|
| R.—Hydriodate of potassa  | 500 grammes. |
| Deuto-chloride of mercury | 415          |
| Product                   | 315          |

Dissolve separately the two salts in a sufficiently large quantity of distilled water; and then pour the mercurial solution into that of the hydriodate of potassa, until it ceases to produce a precipitate. It must not be added in excess, for the iodide in that case will be redissolved. If the last portions of the precipitate are not of so beautiful a red colour as the first, they must be separated and dried in the air. It is necessary before drying the iodide to wash it very carefully.

*Note.*—In proportion as the point of saturation is approached, a yellow precipitate is observed to form, which consists of a mixture of the proto and deuto-iodide. It must now be left to repose; then decanted, and the precipitate washed. On the water used to wash it, pour an additional quantity of the solution of sublimate, until a precipitate ceases to fall.

*Formulae.*

The physicians of the hospitals frequently vary the dose of the different preparations of iodine, so that at present no fixed formulæ can be established. Some of them employ the proportions of M. Magendie in preparing the ointment of hydriodate of potassa, while others prescribe the following:

|                       |           |
|-----------------------|-----------|
| Hydriodate of potassa | 8 parts.  |
| Lard                  | 32 parts. |

The iodide of sulphur is employed at the St Louis Hospital in the following form:

|                       |            |
|-----------------------|------------|
| Iodide of sulphur     | 5 parts.   |
| Lard, recent          | 96 parts.  |
| Or, Iodide of sulphur | 8 parts.   |
| Lard, recent          | 144 parts. |

The iodide of sulphur must be reduced to powder, and mixed intimately with the lard, by being rubbed a long time in the mortar. The iodides of barium, and of calcium, have been employed in the same proportions.

B. E.



*On the Organization of Spanish Pharmacy.*

In the *Journal de Chimie Medicale* for January 1829, we find a short notice by M. Julia Fontenelle on the state of pharmacy in Spain; and as the prosperity of this branch of medicine, in every part of the world, must be interesting to our readers, generally, we have ventured to give a translation of this brief essay.

Spain was in ancient times one of the divisions of Europe in which pharmacy was held in the highest estimation. Under the dominion of the Romans it was cultivated with the greatest success; but not so during the domination of the Goths over this beautiful country. During this dark and barbarous period, pharmacy ceased to be an art, and became merely a system of routine and prejudice. Charlatanism was carried to such a point, that it was decreed by a statute of the realm, that every physician who did not succeed in the cure he undertook, should be treated as an assassin, and his person placed at the disposition of the parents of the deceased. From this degradation pharmacy rose, and shone with greater splendour in the peninsula than in any other country, during its long occupation by the Moors, or Arabians.

Under the dominion of Austria, this art again sunk into contempt, from which it was restored by two sovereigns of the house of the Bourbons.

MM. Lodibert and Laubert communicated to the Society of Pharmacy, a view of the state of this science in Spain, and according to the information given them by M. Thiriaux, ascribe the honour of organizing it to Ferdinand VII. This assertion is incorrect, since it is to Charles the Fourth that this benefit ought to be attributed. This prince conceived so strong a taste for pharmacy, that he caused to be established in his palace a very beautiful laboratory, under the direction of Don Pedro Miege, for the constant performance of chemical and pharmaceutical operations; at which he assisted with the royal family, and particularly with the infant Don Anto-



nio. To promote the prosperity of pharmacy and chemistry, in his states, he also invited there M. Proust; and sent to France MM. Carbonell, Orfila, Garriga, Balcells, San Cristobal, &c.

At this period Spanish pharmacy was governed by the ancient *proto-medicat*, which, not providing any means of instruction, nor of public teaching, it had gradually sunk into disgrace. Witnessing its deplorable state, and animated by his natural taste for the art, Charles IV. attempted to remedy it, and ordained by his decrees of 24th March 1800, 28th September 1801, and 5th February 1804, that he established a superior junta for its direction, in order to give momentum to its progress.

In erecting the instruction of pharmacy into a faculty, he adds, 1. That the three faculties of medicine, of surgery, and of pharmacy, shall possess equal rights. 2. That they shall enjoy the same distinctions and prerogatives. 3. That each of them shall confer the grade of Doctor, with the same pre-eminence. 4. That each of them shall be independent of the other. The first school of pharmacy was then established by Charles IV. at Madrid, with the title of Faculty. Ferdinand VII. afterwards; "penetrated with that which is of the greatest importance to the health of his well beloved subjects, that those, who exercise the art of pharmacy, should possess the information relative to an *object* so sacred, and which can only be acquired by means of methodical teaching, well directed and calculated to extend the knowledge of the natural sciences, which conduce to the progress of agriculture, of industry, and of the arts; has created by his ordinance of February 15, 1815, three other royal colleges of pharmacy, equal in rights to that of Madrid, which shall be placed at Barcelona, Valence, and Seville." To be matriculated into these faculties, according to article 16, chapter 3, of the ordinances on pharmacy of 1804, the pupils must understand the Latin language, and have completed a course of logic and mathematics.

The instructions are divided into four parts :

1. The three branches of natural history.
2. Physics and chemistry.
3. The materia medica, which they call materia pharmaceutica.
4. Experimental pharmacy, or the manner of making the different pharmaceutical preparations, as well as demonstrations or descriptions of divers chemico-pharmaceutic apparatus.

The present government of Spain, adopting the feelings which actuated Charles IV. in respect to this science, has continued to send pupils to France, among whom we are gratified to name M. Casa-Seca, now professor of chemistry at the Conservatory of Arts in Madrid. Spanish pharmacy has revived under these happy impulses, and has risen to a level with the discoveries of the age. It owes its first advantage to its organization, and to the protection which does honour to the government.

B. E.

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*Memoir upon Fecula. By M. Guibourt.*

As fecula, or starch, is by M. Raspail ranked among the number of immediate vegetable principles, and considered an organic body, M. Guibourt has thought proper to submit it to a new examination.

Following this studious observator, (M. Raspail), each granule of fecula is formed,

1. Of an envelope or small tegument, not acted upon by water and the acids at an ordinary temperature, and susceptible of a deep tint by iodine.

2. Of an interior substance, soluble in cold water, liquid even in its natural state, which loses by evaporation the property of becoming coloured by iodine, and possesses all the properties of gum.



M. Raspail draws the following conclusions: That the gums which flow from trees are the same with this soluble part of fecula, which has lost, by exposure to air, the property of changing to blue.

That this property which it possesses, when in contact with iodine, is due to a volatile substance.

Finally, M. Raspail considers this coloration as the result of a simple juxta-position of parts, and not of a combination. (*Annales des Sciences Naturelles*, Vol. VI. 419).

M. Guibourt extracted some fecula from the potato, the kind, employed by M. Raspail. It was well washed and dried, and when examined by the microscope, presented all the characters announced by M. Raspail. It displayed every form from the spire to the gibbous, or rounded triangle; the former being the shape of the smaller, and the latter of the larger pieces. It was smooth, transparent on the surface, and of a gray colour at the edge. The grains are distinct.

This fecula is entirely insoluble in cold water; and after several hours' maceration, the liquid examined by reagents indicated no trace of soluble matter. Dried again, it remained pulverulent, and in isolated grains.

### *Effects of bruising Fecula.*

Fecula bruised in a dry state loses its whiteness and lustre, and sometimes agglutinates when the air is humid. If then it be moistened by water, it forms a tough paste, which acquires the hardness of stone when dry. Pounding it in a mortar creates a mucilage analogous to that of gum tragacanth. This result alone shows that fecula is not homogeneous, but that it is formed of an exterior substance not affected by cold water. The interior differs from it in being highly soluble, when once the former has yielded to the mechanical effect of the mortar. The same result is produced by trituration in water; which proves that it is not owing to the heat developed by friction.

Fecula in its entire state examined under water with a microscope, has the appearance of small pearl; every grain



is perfect. If an aqueous solution of iodine be added to it, the liquor remains colourless, or yellow, if the iodine be in excess; and the grains slowly assume a tint of sky blue, without losing their transparency.

If bruised fecula be submitted to the same test, the instant it touches the water, the latter forms a current with great rapidity, owing to the emission of the soluble matter of the bruised grains. A part of this matter disappears entirely, and part remains attached to the grains under the form of jelly, which also disappears by the application of a gentle heat. It is then easy to perceive the lacerated teguments that served as an envelope to the grains of fecula\*.

If, before any application of heat, a watery solution of iodine be added to the liquor, the part charged with soluble matter, before invisible, becomes of a sky blue, the gelatinous matter assumes a still deeper blue, whilst the teguments, remaining a moment without colour, change also, and become so dark as to appear black and opaque. It is observable that the entire grains, of which a certain number always escape the action of the mortar, assume only the light blue described above, and preserve their transparency.

If these experiments go to prove that fecula is formed of an outer insoluble envelope, and of an internal soluble matter, they show also, that these two substances are alike coloured by iodine; and it may be added, that the greater, or less intensity of colour can be explained by the simple

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\* This experiment affords more precise results than those performed by the acids or alkalis. Thus, dilute sulphuric acid exerts no action upon fecula at a common temperature; a little stronger, the grains undergo no other alteration than a slight swelling; more concentrated, they open at a point and let a current of gelatinous matter escape, and the whole grain soon becomes converted into a homogeneous, gelatinous matter, in which it is impossible to distinguish either tegument or the soluble part. Finally, if the acid be still more concentrated, the whole of the fecula dissolves and disappears.

The results produced by caustic potash are not more certain. If very weak, its action is slight; if more concentrated, the grains increase in volume without bursting; still stronger, the whole is dissolved without residue.

These experiments are calculated to induce a belief in the identity rather than in a chemical distinction between the tegument and the soluble matter.

variation in density and concentration of the same amylaceous principle. Indeed, this principle, when in the gelatinous state, being almost equally susceptible of the action of iodine, becomes coloured as rapidly as when in solution, and the colour is deeper on account of its greater concentration.

The action of the iodine upon the envelope, or teguments, is not so rapid as on the former, but the result is a deeper blue; which arises from the exposure of two surfaces to the action of the iodine, and particularly the inner, which has neither polish nor density of exterior, and which is therefore more easily penetrated by the reagent.

### *Properties of Soluble Fecula.*

To ascertain with certainty that the colour produced upon the soluble matter by iodine was produced independent of the presence of any teguments, a watery solution of the bruised fecula was filtered repeatedly through paper, and the addition of an aqueous tincture of iodine to it produced an intense blue colour without leaving any deposit.

The liquor holding the soluble fecula in solution possesses another property, which cannot be explained without admitting the blue colour to be the result of a combination between the iodine and the amidon; and further, that there exists another compound of these two substances, without colour, as was supposed by MM. Collin, and Gaultier of Claubry.

When a solution of iodine is added, the portion of liquor first coming in contact with it changes to a deep blue; but this colour entirely disappears by agitation. The same effect may be reproduced a number of times, until the liquor will contain a sufficient quantity of iodine to effect an entire change to blue.

How can we suppose that this liquor, colourless, yet containing a considerable quantity of iodine, should not hold it in true combination? Or, that the blue colour, effected by a mixture of an orange coloured tincture with a colourless liquid, should not equally be the effect of chemical



combination? More especially, as a great number of organic principles are changed to its own colour, and not to blue by this orange coloured solution of iodine.

Thus, let the parenchyma of the potato be deprived as much as possible of all fecula, and, after plunging it in iodated water, submit it to the microscope: the cellular tissue will be readily distinguished, changed to a yellow colour; whilst the granules of starch will be found in innumerable quantity, coloured blue. This solution of fecula possesses a third property, which M. Raspail deems a proof of its non-combination with iodine, as well as conclusive that the blue colour is owing to a volatile principle, which evaporation or exposure to air caused to be dissipated: viz. feebly coloured by iodine it very soon became colourless, even in a closed bottle; a little deeper it required longer time to produce the same effect; and of a still darker colour, by exposure to air and the lapse of time, it again became colourless. The fact M. Guibourt explains as follows:

Simple iodated water, that is to say, pure water, charged with a small quantity of iodine\*, is coloured of an orange yellow when first prepared; but in 24 or 48 hours it becomes entirely colourless, even in a closed vessel. This may either be owing to a decomposition of the water, effected by the action of light, from which result hydriodic acid and oxygen; or it may proceed from the two elements of water acting upon iodine, and giving rise to the formation of iodic and hydriodic acids.

Iodated water, thus deprived of colour, when again placed in contact with iodine, dissolves a fresh quantity, and assumes an orange colour not liable to change. It appears probable, that the same cause, which produced the loss of colour in the former instance in destroying the whole or part of the free iodine which the water contained, produced also the loss in the blue iodide of amidon, or at least changed it to a

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\* This iodated water is used with success in scrofulous cases by Dr Lugol, Physician to the Hospital of St Louis.



white iodide. And so little is this alteration to be attributed to the evaporation of a volatile principle from the fecula, that the blue colour may be reproduced by the addition of a little chlorine or iodine. According to M. Raspail, "a substance, exactly resembling gum in its physical characters, without colour, either in a solid state or in solution, may be obtained by procuring the soluble part of fecula, in its greatest purity, and evaporating it in their strata. The coloration then of fecula (in contact with iodine) is only owing to the presence of a foreign volatile principle, which evaporation causes to be dissipated." M. Guibourt is of a different opinion. Having obtained some perfectly pure fecula, and submitted a solution of it to a protracted ebullition, the best possible mode of depriving it of the volatile substance of which M. Raspail speaks, he found the result to be susceptible of a deep coloration by iodine.

Repeated experiments with bruised fecula produced analogous results, and M. Guibourt draws the following conclusions: That boiling a long time does not deprive starch of the property of changing to a blue colour by the addition of iodine; at least, that an ebullition of six or eight hours, and two evaporations to dryness, did not take from it that character; and that soluble fecula dried is not gum, as was supposed by M. Raspail.

### *Is Starch a particular vegetable Product?*

M. Guibourt agrees with M. Raspail, that each granule is the product of organization, and is not formed by simple juxtaposition of parts in the manner of a crystal. He admits, also, that fecula is composed of an exterior envelope; insoluble in cold water and of an interior soluble substance; but believes that the two parts differ more in the form of their organization than in their chemical nature.

Starch then is an organic body, of which the external envelope has a density and adhesiveness of parts much greater than the internal. But as the organization of wood does not prevent us from ranking lignin among the number of im-

mediate vegetable principles, so that of starch need not hinder us from comprehending among those principles the matter which forms it, since that matter possesses chemical properties which belong neither to lignin, to sugar, nor to the different kinds of gum. C. E.

[To be continued.]

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*Abstract from M. Guibourt's Thesis on the Combinations of Mercury with Oxygen and Sulphur, presented by the Author to the Special School of Pharmacy of Paris.*

No doubts remain upon the existence of the protoxide of mercury as long as it is in combination with acids; but it cannot exist in an insulated state. By decomposing the protonitrate or the protochloride of mercury with potassa, carefully excluding the presence of the atmospheric air, a yellowish-black precipitate is obtained, which, treated with hydrochloric acid, yields a protochloride and a deutochloride of mercury. This same precipitate, washed and dried, contains small globules of mercury, which may be perceived with a magnifying glass, and even with the naked eye, when it has been pressed between two hard bodies\*.

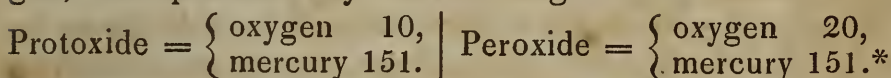
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\* It was already well known that the protoxide of mercury is changed, by the action of caloric and light, into metallic mercury and a deutoxide; but as M. Guibourt has neglected to mention the action of light, and has sometimes employed the agency of caloric, some doubts might be entertained of the exactness of the result he announces; but I have ascertained, by repeating his experiments in the dark, and at a common temperature, that it is perfectly exact. Although the precipitate, recently obtained from the protonitrate of mercury, affords a protochloride of mercury, when treated with hydrochloric acid, it cannot be inferred that it contains a protoxide; because the metallic mercury which separates, when the precipitation takes place, being very minutely divided, acts easily on the deutochloride, which it brings back to the state of a protochloride. This is proved to be really the fact by the relation to one another of these two compounds varying, as the mercury is in very fine powder or in visible globules.



According to this very interesting result, the protoxide of mercury cannot be obtained by triturating together the metallic mercury and its peroxide, although several chemists have advanced the contrary; we obtain, by this means, only a mixture, the brown colour of which is owing to the minute division of the metal and even to that of the oxide. This result explains also why it is impossible to produce immediately the protoxide by heating mercury in the open air.

Although the protoxide of mercury cannot be obtained in an insulated state, the quantity of oxygen it contains may, however, be learned by ascertaining that which exists in the mixture of mercury and peroxide, afforded by the decomposition of the protonitrate or protochloride of mercury by potassa. By applying to this mixture a sufficient degree of heat to decompose the peroxide, M. Guibourt found that the protoxide is composed of 100 parts of mercury and of 4.5 of oxygen; and the peroxide, of 100 parts of mercury and of 8 of oxygen. These proportions come very near to those which have been adopted from the experiments of MM. Fourcroy and Thenard, and which, taking 10 for oxygen, are represented by the following formula:



After a long exposure to light, a part of the peroxide is completely decomposed; it is soluble in water, to which it imparts a strong metallic taste, the property of turning green the syrup of violet, of striking a brown colour with the hydrosulphuric acid, of immediately becoming turbid with ammonia, which forms with it an ammoniuret less soluble than the oxide itself; and finally, of being covered, on exposure to the air, with a shining pellicle, which is constantly precipitated and renewed. These pellicles, collected and dried, exhibit, with the assistance of a magnifying glass, some globules of metallic mercury.

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\* M. Guibourt seems to be disposed to admit that mercury is oxidized at the common temperature by a continued agitation with atmospheric air; but his results are not sufficiently conclusive to permit us to admit them.



The compound of ammonia and peroxide of mercury, when exposed to the action of heat, emits a large quantity of ammonia; the other portion of this alkali is decomposed and produces water: 108 parts of the peroxide, representing 100 parts of the metal, produce 114.7 of ammoniuret of mercury. By taking such a quantity of ammonia, that its hydrogen will saturate the oxygen of the oxide, it is found that 108 parts of oxide produce 113.7 of ammoniuret.

Two sulphurets of mercury, the black and the red, correspond perfectly with the two oxides; the black sulphuret is prepared by causing an excess of hydrosulphuric acid to act on the protochloride of mercury; it is in the form of a black powder. When heated, it affords some metallic mercury and cinnabar, and produces, besides, some hydrochloric and hydrosulphuric acids, but in so small a quantity that they can hardly be considered as essential to the nature of the sulphuret. This sulphuret, as the protoxide, possesses the property of yielding metallic mercury when compressed; and from this circumstance it must be considered as a mixture of cinnabar and mercury. Treated with iron, 108.2 parts of sulphuret yield 100 parts of mercury.

By decomposing the deutochloride of mercury by an excess of hydrosulphuric acid, a black precipitate is obtained, which it is impossible to distinguish from the preceding by its external appearance, but which, nevertheless, differs considerably from it; for, on subliming, it is entirely transformed into cinnabar. Decomposed by iron, it is found to contain, as the cinnabar of the shops, 100 parts of mercury and 16 of sulphur. These proportions correspond exactly with those already obtained by several chemists, and confirm those of the two oxides. M. Guibourt thinks that the black sulphuret, obtained by the decomposition of the deutochloride of mercury by an excess of hydrosulphuric acid, differs from cinnabar only by the interposition of the atoms of foreign bodies; and he supports his opinion by indicating a mode of effecting the decomposition of the deutochloride by means of the hydrosulphuric acid, so as to produce cinnabar. With

time and rest, the particles of the sulphuret come into more intimate contact, and press out, as it were, the particles which separated them, acquiring ultimately the degree of density necessary to produce the red colour. Cinnabar cannot always be obtained by M. Guibourt's process, but he has succeeded in two experiments out of three.

The variety of colours frequently exhibited by the sulphuret of mercury has been considered by many chemists as a proof of the existence of several sulphurets; M. Guibourt shows the insufficiency of this proof, and draws, from the experiments he has made, the conclusion that there is but one sulphuret of mercury; that is, the sulphuret which corresponds with the peroxide of mercury, or with cinnabar.

When a solution of deutochloride of mercury is precipitated by hydrosulphuric acid, but the latter in a quantity less than is sufficient to act upon all the salt of mercury, a grayish white precipitate is afforded, in which M. Fourcroy and Thenard had ascertained the existence of sulphur and muriatic acid. M. Guibourt remarks that this compound is a *chlorosulphuret* of mercury, and that the precipitate, which is afforded by the action of the hydrosulphuric acid on the nitrate of mercury, must be an *oxisulphuret*. M. Gay-Lussac has fixed the attention of chemists upon this peculiar order of compounds, in his memoir on prussic acid; but he has limited himself to mentioning only a few of them.

This short *exposé* shows the importance of M. Guibourt's thesis: we very much desire that such theses may be often presented to the School of Pharmacy of Paris.—*Annales de Chimie et de Physique*.

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*Note.*—We shall, as soon as we can procure M. Guibourt's thesis, give it in full. It appears from the above abstract, which is from the pen of M. Gay-Lussac, that it is a very able essay, and has completely overturned in France and in many other parts of Europe, the old theory of the existence of two oxides and two sulphurets of mercury. We consider it so much the more interesting at the present moment, as several American chemists have, of late, turned their attention to this subject.



*On the Oxides of Mercury.**Black Oxide of Mercury.*

Protoxide of mercury (new nomenclature).

Dissolve one part of crystallized protonitrate of mercury in sixteen parts of distilled water, and pour by degrees into a solution of caustic potassa, until no more precipitate is formed. Wash well the black powder with distilled water; dry it with a gentle heat, and keep it for use in well closed bottles, protected from the light.

It is necessary to ascertain beforehand the purity of the protonitrate of mercury in order to avoid the production of a deutonitrate, which would alter and colour the protoxide. The protonitrate is pure when its solution is completely decomposed by the muriates of soda or potassa, and when the liquor, filtered, does not form a yellow precipitate with potassa, or a black one with hydrosulphuric acid (sulphuretted hydrogen gas).

The mercurial salt must be dissolved in water previously acidulated with a small quantity of nitric acid; otherwise it would be transformed partly into an insoluble yellow subnitrate, and partly into a nitrate with an excess of acid.

Finally, to obtain a very black oxide (which is generally the desired object) it is necessary to pour the solution of protonitrate of mercury into that of potassa in such a manner as to leave a small excess of alkali in the liquor resulting from the mixture of the two solutions.

*Gray Oxide of Mercury (commonly called Hahneman's Soluble Mercury).*

Subprotonitrate of mercury and ammonia (new nomenclature).

|   |           |          |
|---|-----------|----------|
| R.—Mercury                                  | . . . . . | 6 parts. |
| Nitric acid of 32° Baumé's areom. for acids |           | 4 parts. |

Introduce these substances into a glass flask, and heat them till the mercury begins to dissolve; then boil the



liquor until a crystalline mass, of a yellow colour internally, has been formed; let it remain on the fire a little longer; remove it and shake it, to assist the production of a larger quantity of yellowish and irregular crystals. Pour, afterwards, the contents of the flask into a glass mortar, and triturate with the salt the portion of mercury which has not been oxidized; then add more distilled water, slightly acidulated with nitric acid; triturate again for some time, and let the solution stand for a little while. Decant the clear liquor and pour again on the residue more distilled water, acidulated in the same way as above directed, and continue the same operation until all the mercurial salt is dissolved and the metallic mercury has disappeared.

Then unite the different liquors together in a glass vessel, and pour, drop by drop, into the mixture some liquid ammonia, stirring constantly. and taking care not to exceed the quantity of ammonia exactly necessary to the precipitation of the oxide of mercury. The liquor is then permitted to stand, decanted, and the precipitate washed and spread on blotting paper to drain. It is afterwards dried entirely with a gentle heat, and protected from the light.

This preparation must be kept in a bottle covered over with black paper.

When an excess of ammonia has been used, the precipitate is whitish. It is needful, in this preparation as in the preceding, to ascertain beforehand the purity of the protonitrate of mercury. This oxide may be obtained directly from a solution of the crystallized protonitrate, treated with liquid ammonia.

*Red Oxide or Peroxide of Mercury (formerly red precipitate).*

Deutoxide of mercury (new nomenclature).

R.—Mercury . . . . . 16 parts.

Nitric acid of 32° Baumé's areom. for acids 18 parts,  
that is, a sufficient quantity to accomplish the solution of the mercury.

Put the mercury and acid in a matrass with a flat bottom; place on a sand bath and apply a gradual heat, until the solution is accomplished. Then increase the heat and evaporate to dryness. At this point carry the temperature to a still higher degree, until the disengagement of nitrous vapours has ceased entirely; then let the oxide cool, and keep it for use.

The fire must not be continued, as some authors recommend it, until oxygen begins to be disengaged; for this is a sign of the commencement of the decomposition of the red oxide. It is needful to introduce an iron wire into the bottom of the mass contained in the matrass, in order to ascertain whether the matter is red hot, and in this case, to let it cool, provided, however, that nitrous vapours are no longer disengaged.

Should it be desired to obtain an oxide entirely free from acid, and consequently deprived of causticity, it must be prepared in the following manner:

*Peroxide of Mercury, prepared without acid (formerly called mercury precipitated per se).*

Deutoxide of mercury (new nomenclature).

Pour in bottles with a flat bottom, and a long neck, drawn up to the lamp, a sufficient quantity of mercury to cover only the bottom of the bottles. Place them on a sand bath, and increase the fire by degrees until the mercury begins to boil. Continue the same process, without interruption, for several months, and a red oxide will be produced.—*Rattier's Pharm. Francaise.*

*Protonitrate of Mercury, prepared according to M. Henry, Senior's process.*

Nitric acid of 25° Baumé's areometer for acids, eighteen parts; mercury, twenty parts. Proceed with the solution until no more nitrous vapours are disengaged; add, then, ten parts of warm distilled water, and boil gently for a short time; decant the liquor, which will soon after produce crystals. Boil again the mother waters, which will furnish a new crystallization of pure protonitrate of mercury.—*Rattier's Pharm. Francaise.*

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*Means of detecting the Sophistication of Lunar Caustic, or Melted Nitrate of Silver.*

This preparation is frequently adulterated by the addition of a considerable proportion of nitrate of potassa, which renders it whiter. Two different processes are proposed for discovering this adulteration. 1. *Calcination*, which produces silver and potassa; the latter may be separated by a weak acid. 2. By treating the solution of lapis infernalis with an excess of hydrochloric acid, filtering and evaporating to dryness; on calcination, chloride of potassium will be produced.—*Rattier's Pharm. Francaise.*

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*Prepared Sponges, vulgo Tent Sponges.*

Sponges are frequently used in surgery, in order to dilate ulcers; but they cannot fulfil this intention, if they have not



been conveniently prepared, and especially if not entirely deprived of moisture. This latter object is attained by different means; but it appears that the process consisting in soaking them with wax is not the best.

*Sponges prepared with Wax.*

R.—Fine sponges washed, well cleansed and perfectly dry; soak them in liquefied yellow wax, and press them powerfully between two tin plates heated in boiling water; when they are sufficiently cooled, they are removed and kept for use.

*Sponges prepared without Wax.*

R.—Fine sponges washed and perfectly clean; wind them round tight, whilst they are yet moist, with twine, the contiguous windings of which do not leave any interval between them. Secure the twine by a knot, easy to undo; then dry the sponge carefully, and keep it in a dry place.

When this sponge is to be used, the twine is undone, and a piece of a suitable shape is cut with a sharp knife or scissors.

This piece of sponge, thus compressed, absorbs in the wound a sufficient moisture to swell, and, by the increase of volume, to keep the lips of the wound sufficiently open to permit the discharge of the matter and blood.—*Rattier's Pharm. Francaise.*

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*Iodine in the Mineral Waters of Saratoga.—Communicated for the Journal of Science, by John H. Steel, M.D. of Saratoga Springs, in the state of New York.*

The mineral waters of Saratoga, which have become so celebrated for their medicinal qualities, are situated in a low marshy valley, along the termination of a ridge of secondary limestone; they discover themselves in a bed of blue marl,

which covers the valley throughout its whole extent, and to an unknown depth. On digging into this marl, to any considerable distance, in almost any direction, we are sure to find a mineral water; in some places, at the depth of six or eight feet, it is discovered issuing from a fissure or seam in the underlying limestone, while at other places, it seems to proceed from a thin stratum of quicksand, which is found to alternate with the marl at distances of from ten to forty feet; at this last depth, the marl is interrupted by a layer of bowlders of a considerable size, beyond which no researches have yet been made.

All the mineral fountains that have yet been examined in this valley, and there are more than twenty, are found to possess, uniformly, the same *qualities*, differing only in what is usually termed their *strength*, or, in other words, in the quantities of the articles which the water of each is found to hold in solution. They belong to a class which may with propriety be styled the *acidulous saline chalybeate*. The best analyses agree in demonstrating that they contain the following ingredients, viz.

Carbonic acid.

Muriate of soda.

Carbonate of soda.

Carbonate of lime.

Carbonate of magnesia, and

Carbonate of iron, together with a very minute quantity of Silica and alumina.

The great efficacy of these waters in a variety of strumous affections, for which their known properties did not very satisfactorily account, gave origin to the conjecture, that they might contain *Iodine*, and the fact of that substance having been recently discovered in some of the mineral springs of Europe, gave confidence to the opinion, which led to an investigation; as soon, therefore, as leisure would permit, an examination was commenced, with a view to that particular point, and the result of the following experiments will, I trust, be considered as sufficiently conclusive on the subject.

Having procured a quantity of the salts of one of these fountains; soluble in distilled water, I dissolved thirty grains of them in a weak solution of starch in cold water, and then let fall into the solution a drop or two of sulphuric acid; this produced a slight effervescence and the liquor immediately assumed a deep purple tinge,—on suffering this to stand at rest a short time, the colour was precipitated with the starch giving it the well known characteristic blue tinge. The clear liquor was now turned off, and the coloured starch placed upon the surface of a warm stove, when the colour was immediately dispersed.

Having thus ascertained the fact of the existence of *Iodine* in these salts, it became important to acquire a knowledge of the manner in which it is combined and retained in the water.

Iodine may exist in a mineral water in the state of *iodic* or *hydriodic* acid combined with either of the alkalies, potassa or soda, forming the iodate or hydriodate of the alkali with which they are united. As the presence of *potassa*, in any of its combinations, in these waters, has not been indicated by any of the appropriate tests used for the purpose, it follows that soda is the alkaline base, which retains the acid in question, forming the iodate or hydriodate of soda. To ascertain which of these acids forms the salt in question, I poured over a quantity of the dry *soluble* salts of the water an ounce of very pure alcohol, which, after standing a short time, was filtered off; this was found to contain the whole of the matter, which indicated the presence of iodine, and as *iodate* of soda is not soluble in alcohol, I infer that the substance taken up by the alcohol is the *hydriodate* of soda.

With a view to illustrate the position still further, and to arrive at the proportion of this salt contained in a given quantity of the water, I evaporated one gallon of water in a porcelain basin placed in a sand bath, which was kept at the temperature of about  $150^{\circ}$ , and the evaporation was continued until crystals of muriate of soda began to form on the sides of the basin; it was now removed from the bath, and



when cold the whole contents of the basin were thrown on a filter, and the residuum, being well washed with recently distilled water, was removed and the filtered liquor again placed on the sand bath in a small basin, and suffered to evaporate to dryness in a temperature of 150°.

Alcohol of the specific gravity of .825 was thrown over these salts, and, after being frequently stirred, was filtered, and the filtered solution evaporated to dryness. The residuum weighed, while warm, a trifle over three grains. It consisted principally of the hydriodate of soda, with a very minute quantity of common salt, which the small quantity of water in the alcohol used, and, possibly, the imperfectly dry state of the salts, before the alcohol was added, contributed to render soluble in that menstruum.

I now dissolved the salts thus obtained in a small quantity of starch and water, and having placed the solution in a Florence flask, over a spirit lamp, added to it a few drops of sulphuric acid; as it became warm, the blue colour of the starch, which had settled to the bottom of the flask, began to disappear, and at the same time the well known *purple fumes* of iodine, appeared very conspicuous at the neck of the bottle, furnishing the most incontestable evidence of the presence of that highly volatile substance.

Nearly all the mineral springs at this place have been carefully examined, and found, uniformly, to agree in affording indications of the presence of iodine. The waters of Ballston have not yet been examined with a view to this particular object, but, from the striking similarity of the waters in the two places in other respects, there can be but little doubt of their agreeing in this. I had expected to have discovered it in the brine springs of Onondaga, but a bottle of that water, procured through the politeness of Dr Kirkpatrick, afforded no indications of it.

I subjoin the result of an analysis of the Hamilton spring, with a view to illustrate the relative quantities of the various saline ingredients contained in its water.

This fountain is situated in the low ground immediately

behind the Congress Hall; it was discovered and named by Mr Gideon Putnam, one of the early settlers of the place, not long after the discovery of the Congress spring. It was cleared out to the depth of only a few feet, and the water secured by a small wooden curb, and in this situation it remained for a number of years, its water being devoted mostly to the supply of a bathing establishment, erected in its immediate vicinity. After the decease of Mr Putnam, the property passed into other hands, and the well has been recently sunk to a much greater depth, and more effectually secured against the intrusion of foreign substances; by which means the water has been materially improved.

The surface of the spring, within the curb, is constantly agitated, by the escape of large quantities of gas; and as the water passes off, it leaves on the surface of the earth, an abundant deposit of a brownish colour, evidently ferruginous and calcareous.

The water, when first dipped from the fountain, is remarkably clear and sparkling, but on standing exposed to the atmosphere, soon becomes turbid. It is saline, and acidulous to the taste, and when taken to the quantity of five or six half pints, is usually, powerfully cathartic and diuretic.

The temperature at the bottom of the well is uniformly at 50°; and its specific gravity, at the temperature of 60°. Barometer at thirty inches, is\*

The analysis was conducted upon the most approved principles of modern analytic chemistry, and affords conclusive evidence of the correctness of the results here given; the details I am constrained to omit, as they would obviously extend this communication to too great a length.

One gallon, or 231 cubic inches, of this water, when first taken from the well, contains

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\* As there was evidently an error in copying the number in the MS. we leave the specific gravity blank, rather than hazard the filling of the space erroneously.—ED.

|                        |   |   |   |              |
|------------------------|---|---|---|--------------|
| Muriate of soda,       | . | . | . | grains 297.3 |
| Hydriodate of soda,    | . | . | . | 3            |
| Carbonate of soda,     | . | . | . | 19.21        |
| Carbonate of lime,     | . | . | . | 92.4         |
| Carbonate of magnesia, | . | . | . | 23.1         |
| Oxide of iron,         | . | . | . | 5.39         |

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grains 440.4, together

with a minute quantity of silica and alumina, probably 0.6 of a grain, making the solid contents of a gallon amount to 441 grains.

|                    |   |   |   |                   |
|--------------------|---|---|---|-------------------|
| Carbonic acid gas, | . | . | . | 316 cubic inches. |
| Atmospheric air,   | . | . | . | 4                 |

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Gaseous contents in a gallon, . . . 320 cubic inches.

It may be proper to observe, that the gas was extricated from the water, by the application of heat, but was kept in the receiver, at the temperature of 60°, and under a pressure of the atmosphere, indicated by the mercury in the barometer standing at 29.5 inches. A part of the atmospheric air was undoubtedly obtained from the tube used to conduct the gas to the receiver.—*Silliman's Journal*.

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*A Memoir on the Action of Sulphuric Acid on Alcohol, and the products which result from it. Read before the French Academy; by M. Serullas, on the 15th and 22d of September 1828. Translated and abridged by Professor Griscom.*

In this valuable memoir, the author states that the substance called *sweet oil of wine*, results from the decomposition of the yellow liquid formed of sulphuric acid and carburetted hydrogen: a decomposition produced either by its prolonged contact with the colourless liquid which distils



with it, or by the operations to which it is subjected in order to separate and depurate it.

M. Serullas calls this substance *neutral sulphate of carburated hydrogen*, or, *sulphate of ether*. Although it has been seen and handled by all those who have prepared sulphuric ether, it is no less true, that its real nature remains unknown. To obtain it pure the author directs that a mixture of two and a half parts of sulphuric acid and one part of alcohol at 36 should be distilled as for the preparation of ether. After a little ether has come over, the oily liquid, more or less yellow, will make its appearance, sometimes sinking below and at others floating above another colourless liquid which comes over at the same time. In the former case, it is mixed with more sulphurous acid and less ether than the colourless liquor, and in the latter, the acid is mingled in greater quantity with the colourless liquid.

To purify it, after having separated it from the colourless liquid, it must be immediately washed by agitating it with a certain quantity of water to deprive it of sulphuric acid, a portion of alcohol, ether and sulphurous acid; then placed in a capsule under the receiver of an air pump, within which in another vessel is a portion of sulphuric acid, and the vacuum must be carefully continued until the volatilization of the sulphurous acid, ether and alcohol causes an active ebullition. When this terminates, the liquid becomes colourless and transparent, but the vacuum must be continued in order to free it from water. In the course of twenty-four hours the sulphate of carbonated hydrogen is of a beautiful deep green, after having passed through the successive shades of clear green, bluish green and emerald blue.

In this state it is pure, and if kept in a closed bottle, it undergoes no alteration.

M. Serullas concludes that the green colour is owing to the absence of air. It has a peculiar, penetrating, aromatic odour, a fresh, sharp taste, somewhat bitter, resembling mint; its specific gravity is 1.133; it is slightly soluble in water; alcohol and ether dissolve it easily, and from these solutions it can again be abstracted.

Placed under water, at the end of a certain time, it is transformed into a light oil, (sweet oil), which rises to the surface, and into an acid sulphate of carbonated hydrogen which remains in solution.

The light oil is opaque; left at rest it deposits crystals of the same nature as itself.

This separation of the neutral sulphate, into an acid sulphate and sweet oil, may be hastened by heating it with water. In this case a few minutes are sufficient.

The most remarkable property of this acid sulphate of carbonated hydrogen is that of being transformed by ebullition into sulphuric acid and alcohol, without any disengagement of sulphurous acid or gas of any kind.

This acid sulphate of carbonated hydrogen has been hitherto considered as a sulpho-vinic or hypo-sulphuric acid, united to some vegetable matter.

Thus, my analyses of the neutral sulphate, incline me to regard it as a double sulphate of ether and carbonated hydrogen.

When treated with bases, it abandons, as with water, the sweet oil, and forms with them salts which have been called sulpho-vinates, but which must be considered, as Faraday and Hennell first advanced, only as salts with a double base, one of which is the carbonated hydrogen.

This oil, observed in the decomposition of sulpho-vinates, the nature of which no one has hitherto pointed out, is no other than the neutral sulphate of carbonated hydrogen, obtained in such cases in large quantity; so that I may recommend this as a method to be employed in the preparation of the neutral sulphate and consequently of the sweet oil. For this purpose we may heat for a few moments, without distillation, equal parts of alcohol at  $38^{\circ}$  and sulphuric acid; if the mass is considerable, the elevation of temperature on mixing will be sufficient, for even in the cold we obtain a certain quantity. Saturate with clear lime water (*bouillie claire de chaux eteinte*) and filter. After concentrating it a little by a gentle evaporation, cool it, filter again and allow



it to evaporate in a stove. - It crystallizes slowly but perfectly, and we have thus a large quantity of sulpho-vinate, very pure. This sulpho-vinate of lime, being dried with great care, and heated in a retort, the principal product collected is the neutral sulphate of carbonated hydrogen.

The sweet oil of wine obtained in the best manner, by treating the neutral sulphate of carbonated hydrogen with water and heat, is slightly yellow like olive oil, has an aromatic odour, density .921, greases paper like oils, thickens by cold without losing its transparency, and at 35° is solid. When perfectly deprived of water it is a non-conductor of electricity, and may be taken as a type of non-conducting oily fluids.

The author infers from his analysis that it consists of six parts of carbon and one of hydrogen.

The crystalline matter which separates from it has the same composition.

The inferences which M. Serullas draws from his investigation, are on the whole, as follows :

1. That in the action of sulphuric acid on alcohol, there is not formed, as has been believed, hypo-sulphuric acid, united to vegetable matter (sulpho-vinic acid).

2. That there is produced, on this occasion, a combination of sulphuric acid in excess, carbonated hydrogen, and elements of water in proportions which constitute ether (bi-sulphate,) which abandons successively by ebullition the ether which it contains; consequently the sulphuric acid has taken from the alcohol an atom of water.

3. That the bi-sulphate of ether, in the reaction observed at a later stage, in the same operation, loses the part of sulphuric acid which rendered it acid, or rather becomes saturated with carbonated hydrogen, and forms then a neutral sulphate of ether, or a double sulphate of ether and carbonated hydrogen, one part of which distils, while another is decomposed and gives rise to all the products which are known to appear at the same time.

4. That the neutral sulphate of ether, which must now be ranked among well characterised chemical compounds,



and which may be assimilated with ethers of the third kind, is susceptible, by its exsiccation and remaining in a vacuum, of acquiring a fine green colour; that it passes by prolonged contact with water, at common temperatures, to the state of bi-sulphate, by abandoning the portion of carbonated hydrogen which rendered it a neuter or double sulphate, which carbonated hydrogen having experienced during combination, a condensation of its elements, preserves that form, even after its separation from the compound of which it constituted a part, forming liquid carbonated hydrogen, (sweet oil of wine,) and solid crystallized carbonated hydrogen.

5. That the bi-sulphate of ether (sulpho-vinic acid,) is transformed by ebullition in water, into sulphuric acid and water, without any disengagement of gas.

6. That the compounds which the bi-sulphate of ether is susceptible of forming with bases, which in this case, replaces carbonated hydrogen, compounds which have been called sulpho-vinates, are double salts, which, also by ebullition in water, are entirely transformed into alcohol and a sulphate of the base with excess of acid.

7. That the sweet oil of wine, and the crystalline matter which it abandons by repose are formed, as M. Hennell has stated, of hydrogen and carbon in the same proportions as that in which these two bodies exist in bi-carbonated hydrogen.

8. That the sulphuric ether, from the first period of its distillation contains bi-sulphate of ether, and at a later stage, a greater or less quantity of neutral sulphate of bi-carbonated hydrogen, products which are quickly isolated by the evaporation of the ether.

9. Finally—that a means of obtaining the neutral sulphate of carbonated hydrogen, and consequently, of sweet oil of wine, is to decompose the sulpho-vinate of lime, as the most economical mode of preparation, by heating it in a retort, after having dried it, and collecting the product.—*Annales de Chim. et de Phys.* Oct. 1828.

## Miscellany.

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*Perchloride of Cyanogen and Cyanic Acid.*—A compound of chlorine and cyanogen, not before described, has been discovered by M. Serullas. Its formation and properties are stated in an interesting memoir read before the French Academy, on the 28th of July and 1st of September 1828.

The new substance is obtained by pouring into a quart flask, full of dry chlorine, fifteen grains of pure hydro-cyanic acid, prepared by Gay Lussac's method. The flask being well corked, is exposed to the light for several days. A solid substance forms on the sides, which is to be removed, (after blowing out with a bellows the remaining gas,) by pouring in a little water and a number of fragments of glass, which, by agitation loosens the solid particles. These, after being separated from the glass, are to be washed on a filter until the water no longer reddens litmus paper, nor forms a precipitate with nitrate of silver. The washed substance is then pressed and slightly warmed, between folds of blotting paper, until perfectly dry. It must next be distilled from a small retort, in the neck of which, or in the receiver, (which must be kept cold,) it crystallizes in needles of a dazzling whiteness. Its odour is so pungent as to excite tears, especially when warmed, and has some resemblance to chlorine, but its analogy to the odour of mice is very striking. It is but slightly soluble in cold water; but much more so in hot, and is then soon decomposed. Alcohol and ether dissolve it easily, and from these solutions it is separated by water. Its aqueous solution at common temperature, is slowly decomposed, and the



liquid becomes acidified more and more. By ebullition, somewhat prolonged, all the perchloride disappears; there is no disengagement of gas, but a production of hydrochloric acid, and *cyanic acid*, which in this case must be formed of one atom of cyanogen and two atoms of oxygen.

The action of the perchloride of cyanogen on the animal economy is very deleterious; a grain dissolved in alcohol and introduced into the œsophagus of a rabbit killed it instantly. An ounce of water, in which another grain had been agitated, and filtered so as to separate the greater portion which remained undissolved, killed in twenty-five minutes another rabbit which had been made to swallow it. The experiments of M. Serullas, to ascertain the composition of the chloride of cyanogen, result as follows:

Chlorine, . . . . .7346=2 atoms.

Cyanogen, . . . . .2654=1 atom.

*Cyanic Acid.* This is also a new compound, evidently differing in some important particulars, from either of the two substances described as cyanic acid—the one by Wöhler, who did not succeed in isolating it—and the other by Liebig and Gay-Lussac, who ascertained the existence of a cyanic acid in the fulminating compounds of mercury and silver.

M. Serullas has shown, that among the most remarkable characteristic properties of perchloride of cyanogen, is that of decomposing water, and producing hydrochloric acid and cyanic acid.

All that had been previously known of cyanic acid, would lead to the opinion that its elements possessed but little stability, and that it could exist only in combination with a base. But M. Serullas, perceiving the tendency of this acid to give rise to an acid salt, and not very soluble, inferred that in its natural state it ought to be solid, for he had long thought that no acids, except those which are susceptible of becoming solid, have the property of forming fixed acid salts, such as tartrates, oxalates, phosphates, iodates, &c. This conjecture he has fully verified. The cyanic acid is solid, very white, and crystallizes in brilliant transparent rhombs, not



very soluble, and consequently without any very marked taste. It reddens litmus: its density is rather less than that of sulphuric acid, in which it remains suspended, but sinking when the acid is in the least diluted.

It is volatilized at a heat a little above that of boiling mercury: strongly heated, a portion is decomposed, leaving only charcoal: if it is not well dried it yields ammonia and carbonic acid, in quantities proportional to the humidity it may contain.

It dissolves in both nitric and sulphuric acids by heat, but undergoes no change of properties even if those acids are boiled down upon it. Neither nitrous nor sulphurous acid gases are disengaged, and the cyanic acid remains without the least alteration, perfectly crystallized, in plates of the purest whiteness. These are remarkable evidences of its stability.

With potassium it combines, forming potash and a cyanuret of potassium, which produces a blue colour with the sulphate of iron and an acid.

It unites with bases, producing salts, some of which are perfectly characterized by their crystalline forms, and by interesting chemical properties.

It appears to have no decided effect on the animal economy.

Cyanic acid is obtained, by submitting to slight ebullition, perchloride of cyanogen in much water. As a portion goes off with the vapour of the water, before it is converted into hydrochloric and cyanic acids, it is best to use at first a balloon with a long neck, in order to condense and throw back what may be volatilized, until the entire disappearance of the solid substance, and the odour peculiar to it. The fluid, being then a mixture of hydrochloric and cyanic acids, is to be gently evaporated in a porcelain capsule, almost to dryness, in order to expel the greater part of the hydrochloric acid. The cyanic acid begins to crystallize at the commencement of the evaporation, in the midst of the hydrochloric. It is to be washed on a filter, with a little cold water, to remove the last portions of the hydrochloric acid,

till the washings give only a slight precipitate with nitrate of silver, soluble in nitric acid, and insoluble in ammonia, not in excess, which on the contrary increases the precipitate. It must be redissolved in hot water, filtered and evaporated to a certain point, and on cooling the cyanic acid separates in small rhomboidal crystals, transparent and very pure.

The analysis of this substance has rigorously confirmed the composition presumed from that of the perchloride of cyanogen, which gives rise to it.

It is formed of

|           |   |   |   |   |                 |
|-----------|---|---|---|---|-----------------|
| Cyanogen, | . | . | . | . | 0.6189=1 atom,  |
| Oxygen,   | . | . | . | . | 0.3811=2 atoms. |

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1.

It is evident from the preceding statement, that chlorine, combined with cyanogen, exerts an action upon water analogous to that of other chlorides, iodides and bromides; that this combination is transformed, by the decomposition of water into hydrochloric and cyanic acids; that the latter being more fixed and very stable, may be separated, by evaporation, from the other, which is very volatile.

The discovery of the perchloride of cyanogen, independently of the interest which it presents in itself, becomes more important by the discovery of cyanic acid, which results from it, since the latter creates a class of salts before unknown to chemistry.

M. Serullas has combined the acid with several oxides, but as the cyanates may be numerous, he reserves them for the subject of another memoir.—*American Journal of Science and Arts, from Annales de Chimie et de Physique, Aout 1828.*

*Preservation of Hydrocyanic Acid, by M. Schütz.*—A quantity of hydrocyanic acid, prepared agreeably to the process of Ittner, having begun to turn yellow in the course of a month, M. Schütz rectified a part of it from calcined sulphate of zinc, and obtained a colourless acid, which preserved its qualities three years and a half: ten drops were sufficient to kill a large dog.—*Ann. de Chim. et de Phys.*



*Amygdalate Soap of Soda, vulgarly called Medicinal Amygdalate Soap.*—R. Liquid soda (called caustic or soap boiler's ley of  $36^{\circ} = 100$ ; oil of sweet almond (fresh)  $= 210$ . After having poured the oil in a china or earthen vessel, add the soda by portions, taking care to stir it with a silver or glass spatula, until the mixture has taken the form of a soft mass, which it commonly assumes in a few days. Put the soap, while soft, in paper, or wooden moulds lined with paper; when it becomes hard, withdraw it from the moulds, and preserve it for use.

This soap cannot be employed in medicine before it is two months old.

A similar soap is prepared with oil of olives.

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*Of the Origin of Myrrh.*—In the report made of the voyages of the naturalists, Ehrenberg and Hemrich, in Egypt, in Dougolah, Syria, Arabia, and upon the eastern declivity of the mountains of Abyssinia, by M. Alex. de Humboldt (in quarto, Berlin, Germany, 1826),—it is stated that these travellers gathered myrrh from the *Amyris kataf*, which they have described under the name of *Balsamodendron myrrha*. M. Nées d'Esenbeck has described a tree after these Savans, in the 17 livraison of officinal plants, as being the one which furnishes the myrrh. It is Horskal, who first made this observation in giving a description of the *Amyris kataf* & *kafal* (Flora Egyptio-Arabica, Cent. III. p. 80). If the origin of myrrh is henceforth placed beyond doubt, it is to this author that we ought to ascribe it.—*Journal de Pharmacie*.  
C. E.

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*Notice of the Prizes proposed by the Society of Pharmacy of Paris, for a solution of the following questions.*—Question 1. To establish by positive experiment, the theory of the transformation of vinous liquors into acetic acid. The competitors will find the necessary explanations to this question in the reports previously made to the society. (See Journal de Pharmacie, Vol. XII. p. 112, and Vol. XIII. p. 355.)



A gold medal will constitute the prize, of the value of 1500 francs.

Question 2. To determine a series of characters, by which vegetable alkalies may be distinguished, whether from each other or from other organic substances, and sufficiently exact to be applied to the practice of legal medicine.

The society will regard with pleasure any endeavours, on the part of the competitors, to extend their researches to the vegetable alkalies variously mixed, and to furnish the means of isolating them.

The prize will be a gold medal of the value of 1000 francs.

The essays will be written in French or in Latin. They must be addressed before the first of January 1830, to M. Robiquet, secretary of the society, Arbalète street, No. 13, at the School of Pharmacy. The authors will add to their essays a device, a duplicate of which must be forwarded in a sealed letter containing their name and address. The resident members of the society are alone excluded from competing for the prize.—*Journal de Pharmacie.* C. E.

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*Decoloring action of Charcoal.*—An elaborate memoir on this subject, by M. Bussy, which obtained the prize proposed by the Society of Pharmacy of Paris, contains the following results:

1. That the decoloring property, inherent in charcoal, manifests itself only when the charcoal is in certain physical conditions, among which, porosity and division hold the first rank.

2. That the azote is devoid of effects; that the foreign substances which the charcoal contains exert no decoloring action, with the exception of sulphuretted hydrogen, and the sulphurets under some circumstances only: if the foreign matters appear to have an influence in the decoloration, it is occasioned by the development of surface merely in consequence of the mixture.

3. That no charcoal can discolour when it has been heated

so strongly as to become hard and brilliant; that all its varieties on the contrary enjoy this property, when they are sufficiently divided—not by mechanical action, but by the interposition of some substance which opposes their aggregation.

4. That the superiority of animal charcoal, such as that of blood, or gelatine, arises from its great porosity; which may be considerably increased by the effect of matter with which it is calcined, such as potash.

5. That potash is not limited in its effect of increasing the porosity of the charcoal, by the abstraction of the foreign substances it may contain, but it acts on the charcoal itself, in attenuating its molecules, and that by calcining vegetable substances with potash, a decoloring charcoal may be obtained; and also by the calcination of vegetable or animal matters with phosphate of lime or clay.

6. That the decoloring force of different charcoals, ascertained with respect to one substance, generally follows the same order in all others; but that the difference between them diminishes in proportion to the difficulty of decoloration in the different liquids on which they are tried.

7. That charcoal acts upon colouring materials by combining with them without decomposing them, as alumine would do, and that in some cases the colour can be made alternately to appear and disappear.

8. That the following are the relative numerical forces of the decoloring power of the charcoals employed, *first*, upon a test solution of indigo, and *secondly*, upon a test of diluted molasses.

|   | Indigo. | Molasses. |
|---|---------|-----------|
| Blood calcined with potash, . .   | 50      | 20        |
| Blood calcined with chalk, . .  | 18      | 11        |
| Blood calcined with phosphate of lime,  | 12      | 10        |
| Gelatine calcined with potash, . .  | 36      | 15.5      |
| Albumen calcined with potash, . .   | 34      | 15.5      |
| Fecula calcined with potash, . .  | 10.6    | 8.8       |
| Charcoal of acetate of potash, . .  | 5.6     | 4.4       |
| Charcoal obtained by the decomposition of<br>sub-carbonate of soda by phosphorus, | 12      | 8.8       |



|  | Indigo. | Molasses. |
|--|---------|-----------|
| Lamp-black calcined, . . . . .                                     | 4       | 3.3       |
| do calcined with potash, . . . . .                                 | 15.2    | 10.6      |
| Charcoal of bones treated with muriatic acid and potash, . . . . . | 45      | 20        |
| Charcoal of bones treated with muriatic acid, . . . . .            | 1.87    | 1.6       |
| Vegetable or animal oil calcined with phosphate of lime, . . . . . | 2       | 1.9       |
| Charcoal of bones—crude, . . . . .                                 | 1       | 1         |

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*Sophistication of Kermes Mineral with Red Saunders.*—M. Clairat states that this medicine is frequently adulterated with the above named wood, as well as with the bolus armenia. When the former substance is used for deteriorating this preparation, it may be detected by throwing it into clear water; the kermes will gradually sink, while the saunders will float. One parcel yielded fifty per cent. of this wood in powder.—*Journal de Chimie Medicale, April 1829.*

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*Mercury detected in Swaim's Panacea by Chemical Analysis.* By Robert Hare, M.D. Professor of Chemistry in the University of Pennsylvania. (Communicated in a letter to Dr Hays.)—"In February 1827, I procured from the shop of Mr Peter Lehman, druggist, sign of the Golden Lion, High-street, a bottle of Swaim's panacea, for the purpose of testing it for certain active metallic preparations, which it was supposed to contain. Upon examination I found it to be clogged with so large a proportion of syrupy matter, that I considered it an object to get rid of this matter before prosecuting my examination. I therefore diluted about two-thirds of a bottle of the panacea with about two gallons of water, and added some yeast in order to induce fermentation.

"Other subjects having absorbed my attention subsequently, the liquid remained covered up in the glass vessel into which I had introduced it, until nearly a year had elapsed. I then transferred the whole of the liquor, then much attenuated by fermentation, and the matter which had sub-



sided from it, into a flat stone-ware vessel, and placed it in my evaporating oven. From this situation, this vessel was not removed until the contents had been converted into a dry, blackish, porous crust. Of this crust the greater part was subsequently removed from the evaporating vessel, and being rolled up in paper was placed upon a shelf. Towards the close of the last summer, I happened to examine the crust attentively, when I observed on it some globules of metallic mercury. On further examination with the aid of a lens, I discovered it to be so replete with mercurial globules, that whenever any fresh portions of the crust were opened by means of a knife, more of them were observable. The crust was subsequently shown to Dr Physick, Dr Horner, and other intelligent friends, and it has been preserved in a bottle. I should have communicated these results to the public sooner, had I not been in hopes to have repeated the examination by another process; but not having as yet found it convenient to realize that intention, and as you deem it of importance that the facts which I have mentioned should be published, I send this statement to you for the *American Journal*.”—*Amer. Journ. of Med. Sci.*

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*Philadelphia College of Pharmacy*.—An annual commencement was held at the hall of the College, on Wednesday the 24th instant. An eloquent, practical and appropriate address was delivered by Daniel B. Smith, president of the institution; and diplomas were granted to seven young gentlemen, who passed their examinations in the spring with great credit to themselves and the college.

Although without parade, yet the ceremony was sufficiently impressive; and we are persuaded the graduates will bear with them through life a pleasing recollection of the events of that evening. We regret that the address could not appear in this number of our *Journal*; it shall, however, form the leading article in our next.—*Ed.*

# JOURNAL

OF

**The Philadelphia College of Pharmacy.**

*NEW SERIES.*

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VOL. I.—JANUARY 1830.—NO. IV.

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## **Original Communications.**

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*Address delivered by the President, Daniel B. Smith, before the Philadelphia College of Pharmacy, at the Annual Commencement of the College, September 24th, 1829.*

It would ill become me, upon the present occasion, and before the present assembly, to attempt by any ambitious effort of rhetoric to captivate or amuse the audience. I cannot forget that we are all plain and practical men of business— assembled here for supporting an institution, the origin and end of which is our own pecuniary advantage. It is true that our profession or business is of a very mixed character—that while on the one hand, we are mere shopkeepers and manufacturers, we are, on the other, compelled to pursue a course of study, and to acquire an extent of information, scarcely less scientific and diversified than those of the physician. There is not indeed any business or trade in the community so nearly allied to the learned profession, and



for a fair reputation in which a greater degree of probity and intelligence is required by public opinion. The merchandise in which we traffic is brought from every region of the globe, and consists of so great a variety of the productions of the animal, the vegetable, and the mineral kingdoms, that to be a skilful druggist is to be not merely a well informed merchant, but a learned naturalist. The daily experience, I will not say of the laboratory, but of the shop and the counter, is a continual application of chemical principles, without a knowledge of which we should be ever groping in the dark. Even where these qualifications are possessed, there must be the still higher attainment of strict integrity and of an earnest devotion to the profession, in order to secure that implicit confidence, on the part of the public, which is the most cheering reward of an honest and skilful apothecary.

If then we are seeking to promote our own private advantage in the establishment of this college, we are seeking to promote it by liberal and patriotic means, the success of which will advance the public welfare in a far greater and more lasting degree than the whole amount of our own individual profit; for the latter will perish with us or our children, and the former I trust will go on increasing with the progress of philosophy and society. The object of this institution is the improvement of the theory and practice of pharmacy, not merely in books and treatises, but on the broadest and most extensive scale at the laboratory and the counter. ✱ For this purpose we are providing means for educating our apprentices in all the learning of the age which has a bearing upon their profession, and for imbuing them with habits of the strictest method. The inevitable effect of this system will be, that we, who are now the older members of the college, must apply ourselves again to our studies, must keep pace also with the improvements of science, or we shall see ourselves outstripped in the career by the boys whom we have instructed. Most, and indeed I may say all of the founders of this institution were men who made no pretensions to accurate science or profound learning.



They had been taught the art of the apothecary as practiced in this city—loosely and clumsily, I may now say, without any disparagement to ourselves. They felt the evils of being ignorant of scientific principles and of a deficient pharmacy, and they resolved to apply a remedy. It cannot be supposed that shrewd and enterprising men, such as first embarked in this undertaking, could be blind to the consequences of making their apprentices better apothecaries than themselves. They did perceive them, and met them with a public spirit and a disinterestedness which make me feel proud of my profession.

The benefits which were anticipated from the formation of the College of Pharmacy were of a remote and general kind. It was not then supposed that the reaction of the spirit of improvement could sensibly affect the practice of pharmacy until after a lapse of many years, and to these remote advantages they sacrificed those which many of them possessed as leading druggists, by placing themselves on a level with all who chose to accede to the terms on which the college was established. Their expectations were more than realized, and all who are acquainted with the medical statistics of this city will bear witness to the assertion that the practice of pharmacy has already, since the commencement of our institution, experienced a most salutary and remarkable improvement.

The mark at which we are aiming is however much above the standard of any present attainment. Before we can assume to compete with the kindred institutions of the old world, our system of scientific instruction must be extended to other branches of natural history, and rendered more thorough and minute in those which are already taught; and the candidates for the honours of the college must undergo a close and probing examination before they are admitted to practice under its diploma. Our members must be willing to subject the contents of their shops to periodical scrutiny by impartial and competent judges; the college must exercise a vigilant police over the market for drugs, and over the

weights and measures used in the administration of medicines. We must possess a Pharmacopœia adapted to the condition of this country, and founded upon strict analysis and experiment, in which, without blindly following the formulæ of any foreign college, we may avail ourselves of the lights which are scattered throughout all.

In proportion as we attain these objects shall we realize the great advantages which it is in the power of this college to confer. And it will happen in this, as in all similar cases, that the advantage of it will not be confined to ourselves, but many other classes in society—nay, the whole community will be in a greater or less degree, either directly or indirectly, profited by the improvement and prosperity of our science.

In thus looking to the future with hope, we are naturally led to look back and abroad for instruction, and it may not be an unprofitable task to mark the progress and present practice of pharmacy in foreign countries.

Without exploring the history of ancient nations for the vague and unsatisfactory notices that may be gleaned from their pages, it will be more instructive to mark the first rise of our profession at the restoration of letters in Europe. The business of the apothecary as a separate profession is said first to have existed among the Arabians in the eleventh century. From them the practice spread into Spain and Italy, and following the path of medicine and letters, to Germany, France and England. The language of one of the first European edicts for their establishment, that issued by the emperor Frederick II. for the kingdom of Naples, furnishes a curious example of the change effected by time in the signification of words. This edict provides that the *confectioners* should take oath to keep by them fresh and sufficient drugs, and to make up medicines exactly according to the prescriptions of physicians; it also fixes a price at which the *stationers* may vend the medicines thus prepared. An *apothecary* at that period was simply one who kept an *apotheca* or store or warehouse.



With the discovery of the art of distillation and the introduction of chemical medicines the importance and dignity of the apothecary increased. In many places, and particularly in the opulent cities of Germany, the apothecaries' shops were established at the public expense, and belonged to the magistrates. At the courts of Germany it was very common for the consorts and sisters of the princes to establish and conduct them for the relief of the poor. From these causes in part it has happened that the apothecary has ranked higher in that country than elsewhere. In many places he was a functionary of the government, attached to the court, and receiving a salary. In all he was protected from competition by being one of a number limited by law, and the path to wealth and distinction was thus secured to him. About the close of the fifteenth century, that spirit-stirring era in the annals of our race, the rising importance of the science of medical chemistry appears to have attracted the attention of the petty sovereigns of Europe. It was at this period that Paracelsus introduced the use of mercury, and after filling Europe with his fame, died in the prime of life with a bottle of his celebrated panacea in his pocket! The earliest professorship of chemistry established in Europe was that of Basil, which was first filled by this insolent and intoxicated enthusiast. At Augsburg there were apothecaries' shops so early as the thirteenth and fourteenth centuries. In the middle of the fifteenth century a salary was paid by the city to the persons who followed that occupation, and in the year 1502 a price was set upon all their medicines; all others were forbidden to deal in them; and their shops were ordered to be inspected. These regulations form the basis of the German police of medicine at the present day. The apothecaries are limited in most of the towns to a certain number, so that the ownership of a licensed shop is of great value, and the strictest vigilance is used in the inspection and administration of medicines.

A lively French writer gives the following sketch of the condition of the apothecary at Vienna, which may be taken as a fair specimen of his situation throughout the large cities



of Germany. The number of Pharmaceutists in Vienna is limited, and in their shops the manual labour is distributed, so that one pupil makes all the pills, another all the mixtures, and this alternately for a month or quarter. The prescriptions are copied in a book to which the physician or the patient may at all times refer. The German apothecaries never contend with each other by underselling. They enjoy a consideration founded upon that which they pay to each other; their establishments are a fixed property, and there is neither rivalry nor collusion among them. Secure of realizing a fortune by their business, they introduce a rigorous method into all its details. Less splendid in the exterior of their shops than the French; they have more true solidity in the arrangements within, and their medicines are recommended by the excellence of their preparation. The German apothecaries have prevented their business from becoming purely mercantile. They have commanded respect from others by paying it themselves to their profession. In the midst of wars and disorders the German apothecaries have profited by the discoveries and improvements of other nations, and have remodeled their dispensatories upon the most scientific principles. More copious than the English, and less prolix and complicated than the French, their pharmacy has adopted the best parts of the Pharmacopœias of London and Paris, and is intermediate between these two systems. The Germans accordingly furnish apothecaries to many of the neighbouring countries. They enjoy the monopoly of the business in Prussia, and there are none but German apothecaries in Moscow and St Petersburg.

In the latter city an apothecary dare not make up a prescription of any practitioner whose name is not in the printed lists of physicians; nor can he venture to sell a drug, however small in quantity or insignificant in quality, without a prescription regularly signed; and every thing sent from his shop must be wrapped in a sealed packet.

The practice of pharmacy in England has remained unfettered by any other legal restraints than those which restrict

other branches of industry in that kingdom. The physician originally prepared and furnished the medicines for his own patients, but by degrees those who prepared the medicines became a separate class of men. The apothecary in England was at that time precisely what he is in America at this day—a retailer and compounder of drugs. The temptation to prescribe for his customers appears to have been too strong to be resisted, and the apothecary lapsed by degrees into the practising physician. The regularly educated resisted this innovation as long as it was in their power, and the controversy on the subject was both virulent and ludicrous. The apothecary however triumphed, although he rendered homage to the physician as his superior. He became the ordinary practitioner in families, charging not for his advice but for his attendance and medicines, and yielding his post to the physician in cases of emergency. The alliance is more profitable to the craft than to the patient, for it has given rise to such an immoderate use of medicines among the English as has become proverbial, and justifies in degree the sarcasm of a French writer, who says that they carry their idolatry to medicines to such a pitch that they bear about them wherever they go their favourite salts and digestives.

In London, and all the cities and towns of Great Britain, apothecaries, or as they there style themselves, druggists, are now to be found who confine themselves to selling medicines, and who do not prescribe. Within the last forty years this class of tradesmen has greatly increased, and the principal shops of the kind in London are perhaps among the best regulated in the world. In one especially—the most celebrated in that great emporium—the system of business is so perfect as to excite admiration. The shop is situated in a narrow court, the only access to which is through an arched alley. Before any article is allowed to be sold it is examined and approved, and if a chemical preparation, is tested by one of the partners, and no medicine is permitted to pass out of the shop but of the finest quality. Each clerk has his particular station at the counter, and the requisites of business



about him, his own money drawer and medicine bottles, scales, measures and papers, for the utmost cleanliness of all which he is accountable. He sets down all the money he receives, as it is paid in, and keeps his own cash account. No conversation above a whisper is allowed except on business.

A minute account is kept, and an investigation made at regular periods by one of the proprietors, into all the incidents of the shop, the errors in putting up medicines, or in the cash accounts, and of the manner in which the rules of the shop, which embrace all the minutiae of cleanliness and method, have been observed. Such strict system and accuracy may be difficult to enforce, and may seem like an useless waste of time. But there is no such thing as too much system or accuracy in the business of an apothecary; and the great reputation of the shop to which I allude is a proof that it is profitable as well as creditable. A thousand guineas, it is said, have been offered to the proprietors as a fee for an apprentice.

The history of pharmacy in France however presents more materials for our instruction than in any other country of Europe. The trade of the apothecary had its origin in that kingdom in the thirteenth or fourteenth century, and the apothecaries were for a long time the menials of the physician. The oath which the latter imposed upon the former before they were allowed to open shop is a curious example of the mental slavery of the times. The apothecary bound himself by the most solemn sanctions of that superstitious age, to give no medicine whatever without the counsel of some learned doctor, to do nothing rashly without *advice*, never to speak disrespectfully of the ancient doctors, but to honour and render service to them, and to do every thing for the honour, glory, and majesty of medicine. Another part of his oath is as little to the credit of his morals as that which I have quoted is to his independence. He bound himself not to administer poison even to his greatest enemies, and never to substitute one medicine for another without the advice of a person wiser than himself.



In a country where such an oath could have been exacted, and men were found servile enough to take it, we cannot wonder at the contempt into which both the physician and the apothecary sunk, and with which even the overwhelming satire of Moliere could not have covered them, had there not been as much truth as wit in his exquisite caricatures.

The profession of the apothecary has however long since recovered its respectability in France, and has been elevated and protected by a code of laws which deserves in most respects to be universally copied.

Many wholesome regulations were enacted under the Bourbons about the middle of the last century; but the laws which created and now govern the schools of pharmacy were the offspring of the revolution. The number of physicians who were members of the national assembly will account perhaps for the great attention which was paid by that body to the interests of the healing art; but it is nevertheless one of the extraordinary features of that period of violence and bloodshed, that neither its foreign nor civil wars, desperate and ferocious as they were, interrupted to any extent the progress of science and the arts.

The French law regulating the sale and dispensation of medicines establishes three schools of pharmacy—one at Paris, another at Strasburg, and a third at Montpellier. Each of these schools is obliged to open at least four courses of experimental lectures—one on botany, one on the natural history of medicines, and the other two on practical pharmacy and chemistry.

The pharmaceutists in those cities are compelled to enter at the school the name, age and other circumstances of their apprentices, who are all obliged to attend the lectures. An apprenticeship of eight years is required before a person is allowed to open a shop, except he has attended three courses of lectures in one of the schools, when only an apprenticeship of six years is exacted. We may suppose that the course of instruction in these schools is both learned and extensive from the length of time it occupies, which

is five months, and from the strict scrutiny which is exercised over the attendance of the pupils. A roll of their attendance is kept, and the professor at the end of the course delivers to each one who has attended a certificate thereof. An absence without a legitimate excuse from six lectures will deprive a pupil of this reward. A prize is annually delivered at the expiration of the course for the best essay on any of the sciences taught in the schools.

When a pupil wishes to become a licentiate, he is required to produce the certificates of the school where he has studied and of the pharmacutists with whom he has served his time, as well as an attestation of his moral conduct, signed by two resident citizens and two authorised pharmacutists. He must also produce a certified copy of the register of his birth, to prove that he has completed his twenty-fifth year. If the director and professors of the school are satisfied with these documents, they appoint a day for the first examination. The student must undergo three public examinations, the interval between each of which must be at least a month. One of these is on the principles of the art; another on botany and the natural history of the *materia medica*; the third examination is on the practice of pharmacy, and continues for four days. It consists of at least nine chemical or pharmaceutical processes, performed by the candidate in the presence of the examiners, to whom he must describe the materials, the operation and the results, and explain the rationale of the process. He must receive the votes of two-thirds of his examiners before obtaining his diploma.

In those places where there is no school of pharmacy established, the examinations are conducted in the same manner by a jury composed of physicians and pharmacutists, and no person is allowed to practice pharmacy unless licensed by a jury, or by one of the established schools. The licentiates of the schools can exercise their profession in all parts of the kingdom; those of the juries are restricted to the department in which they have been examined. No phar-



maceutist is permitted to sell any secret medicine. At Paris, Strasburg and Montpellier an annual inspection of the shops and warehouses of the pharmaceutists and druggists is performed by a board consisting of two professors in the medical school, the members of the school of pharmacy and a commissary of the police. All deteriorated or badly prepared drugs are seized by the commissary, and the person in whose shop they are found is liable to a fine of one hundred livres and an imprisonment not exceeding six months. These annual visits of inspection are paid in other places by the juries who examine the candidates. The laws regulating the sale of poisons are exceedingly severe, and the list of forbidden medicines extends considerably beyond the usual limits of caution in this country. It includes not only arsenic, corrosive sublimate, and lunar caustic, but the mineral acids, several preparations of zinc, antimony and copper, and caustic potash. All these substances are required to be kept in secure and separate apartments, of which the master of the shop alone keeps the key. They are to be sold to none but a known and resident person, under a penalty of three thousand francs; and all purchasers must write their names and residence, the quantity and nature of the poisonous drugs they have bought, and the purposes for which they are wanted, in a register open to the inspection of the police, under the same penalty.

There is another branch of the public law of France on this subject which deserves our particular attention, for it strikes at the root of a practice of great extent and great mischief in our own country; I allude to the encouragement given by our druggists to ignorant, idle, and drunken collectors of herbs and roots. No person is allowed to follow the business of an herborist, as it is there called, without undergoing an examination into his competency before the same bodies which examine the pharmaceutists. This examination extends to his knowledge of medicinal plants and of the precautions necessary to their collection and preservation. A certificate of examination is furnished to the successful

candidate, and he is subjected to the annual visits of inspectors in the same manner as the pharmacutists.

Notwithstanding the wisdom of many of these regulations, it appears that in the enforcement of the law many abuses have crept in. The professors in the schools of pharmacy, in order to augment their fees, have been very lax in their examinations, and the juries have been still more careless of the qualifications of candidates. The consequence has been that the country is overrun with ignorant and unqualified licentiates, who blend other branches of industry with the sale of medicines.

These abuses attracted the attention of the society of pharmacutists of Paris, which addressed a memorial in the year 1817 to the chamber of deputies on this subject. In this memoir they speak with becoming pride of the high character of their profession. "The knowledge" say they "which pharmacy requires, without being as extensive, is in part the same as that which is necessary to the physician. It is as various, and is sufficiently useful to entitle him who possesses it to the particular protection of government and to general respect. The pharmacutists enrol in their number men of distinguished learning, who belong to the most celebrated academies, skilful professors who fill the chairs of chemistry and natural history, writers whose works are sought for in France and abroad, respectable citizens whose public services have been rewarded by honours, titles and decorations." It is only to enumerate the names of Parmentier, Vauquelin, Deyeux, Henri, Planche, Pelletier, Virey, Boullay and Robiquet, to vindicate the warmth of this honest eulogium.

In speaking of the abuses which had crept in through the causes to which I have alluded, they observe that "the number of established pharmacutists soon exceeded every where the wants of the inhabitants. This disproportion between the shops and the population was equally fatal to pharmacy and the public. When the confidence of physicians and patients is divided between too great a number



of shops, does it not offer temptations to the least successful, which are at the least of great inconvenience to those who trust for their cure to the faithful execution of the prescriptions of the physician? Whatever may be the probity of a pharmacist, his pecuniary means, his credit and his sales always influence the proper choice, preservation and renewal of the medicines he employs. This profession bears no resemblance to those in which the prosperity of the trader is useful only to himself. The prosperity of the pharmacist is a guarantee to the public almost equal to that which is afforded by his learning. This guarantee disappears if the multiplicity of shops places a part of them in a precarious situation.

"The medical juries" say they "have peopled the country and the small towns with apothecaries destitute of all the requisite learning and science, whose knowledge of their business was limited to a few manual operations.

"The want of discipline and inspection opens the door to many other abuses. Perfumers, confectioners and distillers undertake to sell medicines; and to crown these disorders a cloud of charlatans, without title, without learning, and without shame, have established themselves in the towns and villages, cover the walls with their bills, and distribute them on the bridges, the wharves and public walls. These men are neither physicians, surgeons nor pharmacists; yet they practice physic, surgery and pharmacy; they inundate the country with their nostrums; and the public journals, which are hired for the purpose, daily make a boast of these pretended specifics."

Who does not recognise in this sketch of the condition of pharmacy in France many of the evils which mark in a far higher degree its state in our own country—the want of scientific skill and of competent qualifications—and the evils of unrestricted competition.

The pharmaceutic code of Prussia has provided against the abuses of which the French pharmacists complain, by requiring and carrying into effect a far more rigorous exami-

nation of the candidates. The laws of that kingdom require that a candidate for examination must have served a regular apprenticeship of five years, or have been employed for three full years as an assistant in a licensed shop, and at the completion of either period must have attended two full courses of lectures on botany, chemistry, natural history, pharmacy and medical jurisprudence. The board of examiners is composed of two chemists and naturalists, and two scientific and practical apothecaries, who are paid by the government, and have had no part in the instruction of the pupil. The candidate is first obliged to translate passages taken at random from the Prussian Pharmacopæia, to satisfy the board of his skill in the Latin language. He must then write a Latin theme on two subjects of chemistry or medical jurisprudence, the titles of which are drawn by lot from an urn. This theme must be written in eight hours, in the presence of the examiners, without the aid of books, assistants or extracts. If he pass this ordeal, two difficult subjects of pharmaceutic or analytic chemistry are given to him, upon which he is obliged to write a theme at his own dwelling, with the aid of books, in order to prove that he has received the highest scientific chemical education. He then draws by lot two chemical or pharmaceutic substances, either natural or artificial, and is allowed eight days, at the end of which time he must have made a complete analysis of them, and written down the results of his experiments. He is also obliged to analyse the contents of the purposely poisoned stomach of an animal, and to write a juridico chemical paper thereon. Not satisfied with so close a scrutiny, which would deter any apothecary in this country from soliciting an examination, the candidate is then required to draw by lot the names of two pharmaceutic compounds of difficult preparation, which he is obliged to prepare in the presence of the committee extemporaneously.

Specimens, fresh and dry, of officinal plants, ten samples of drugs, and several chemical preparations are then placed



before him, which he must name at sight. He must then give accurate scientific descriptions of the plants and of their uses, must describe the origin, properties, and adulteration of the drugs, and the chemical elements, mode of preparation, and usual adulterations of the chemicals, and the means of testing their purity.

The examiners are obliged to be present through all these trials, and to keep accurate minutes of their proceedings, and of the success or failure of each attempt. If they approve of the candidate by a majority of votes he is admitted to the public examination, at which he must answer questions in chemistry, natural history and medical jurisprudence; after which, if he is still further approved of, he is recommended to the minister of the interior, who gives him a license to practice his art.

From this brief and imperfect sketch of the laws regulating the practice of pharmacy abroad, let us turn to the condition of the art in our own country. How great is the contrast! An entire absence of legislative enactments, and with the solitary exception of this city, an almost entire want of professional emulation and of scientific instruction. This state of things has arisen from the freedom of our institutions, which places no restraint whatever upon private enterprise, and from the recent settlement of the country, which still checks that subdivision of labour that is perhaps necessary to the highest degree of excellence in the arts and sciences. It is but a few years comparatively since the business of the apothecary was separated from that of the wholesale druggist and the dealer in paints and dye stuffs. Not thirty years ago almost the only apothecary's shop in Philadelphia, where the physician was sure of obtaining the latest foreign preparations, of having his medicines and prescriptions prepared under the eye of the master, and with competent pharmaceutic skill, or in which a strict system of accountability was carried through the details of the shop, was that of the late Charles Marshall. The cause of his success in business was his strict integrity, his scrupulous accuracy,

and his patient attention. As the first president of this college he is entitled to our respect and remembrance. He was one of its warm supporters, and though too far advanced in years to take an active part in its proceedings, the interest which he felt in its welfare continued to the close of his long and useful life.

It is now about ten years since an accidental circumstance first impressed the apothecaries and druggists of Philadelphia with the necessity of exercising some supervision over the sale of medicines. A case of opium was purchased in New York by one of our principal dealers, which was said to be Persian opium, and which was soon discovered to be a fraudulent preparation. A meeting of the trade was held and a committee appointed to investigate the history and nature of the opium, which they did, and published their report in the daily papers. The fraudulent drug was immediately withdrawn from the market, and no similar attempt at imposition has since come to the knowledge of the public. From that time the necessity of forming an association of druggists became a favourite subject of discussion with many in the trade. In the year 1821 the trustees of the University of Pennsylvania, at the suggestion principally of the professor of materia medica, made provision for conferring the degree of Master of Pharmacy on those apothecaries who should be deemed most competent to the business, and for the establishment of lectures on pharmacy, the examination of candidates, and the admission of them to practice under the sanction of the medical school of the university. This arrangement was defective in many respects; it would have created a controul over the business of the apothecary without any equivalent compensation, such as our college has rendered. The druggists therefore resolved to take into their own hands that supervision and improvement of their trade which was acknowledged on all hands to be expedient. A meeting was held on the 13th of February 1821, at which the principal druggists attended, when it was resolved to form a college of apothecaries for the pur-



poses of regularly instructing apprentices in the scientific parts of the business and of checking the prevalent abuses. The college was incorporated in the year 1822, by the title of the Philadelphia College of Pharmacy, and its career from that day to the present has been one of steady and active exertion for the improvement of our business. The extent of these exertions and of the advantages which have flowed from them are not now appreciated, for they consist in great measure in clearing the ground and laying the foundation for future labours. The first efforts of the college were directed to the formation of a school of Pharmacy. The regulations which it has adopted in relation to this, are perhaps all that the present state of our business will admit. The members are restricted from taking apprentices for a shorter period than four years, and each apprentice is required to attend two full courses of lectures, one on *materia medica* and pharmacy, and the other on chemistry. At the expiration of his apprenticeship he may, provided these conditions have been fulfilled, become a candidate for the diploma of the college, and must submit to an examination before a committee, consisting of the professors and three members appointed by the college. Our diploma is of course but an honorary distinction, that confers no privileges or advantages beyond those which public opinion accords to the well instructed and intelligent. It bestows no title, for it was the design of the college to avoid any name which may hereafter acquire a peculiar meaning, and become the designation of a new class analagous to the English apothecary. In attempting to avoid this danger, it has committed what may perhaps be esteemed a blunder, by establishing a distinction without giving to it a specific name, and simply declaring that the successful candidate is a graduate in the college. Those who have already passed their examination may be disposed to smile at the contrast between the trial to which they have been subjected and the severe ordeal of the Prussian code. It is true that we require as yet no proof of skill in analytic chemistry, but the questions of the ex-

aminers extend to all the branches of chemistry, pharmacy and natural history which are taught in the lectures, as well as to the more practical details of the business of an apothecary. To answer these questions with the promptness and accuracy that have in most cases been done, implies an acquaintance with the theory and practice of our art highly creditable to the candidates, and when contrasted with the state of things but a few years past, full of promise for the future. A taste for chemical pursuits has been awakened in our apprentices, who have formed themselves into a chemical society, which meets in this hall under the auspices, we may say, of the college. We already perceive the beneficial effects of thus arousing their ambition in their increased attention to our interests and their love of the business, and I speak from experience when I say that the direct and immediate influence of the school of pharmacy has been to enhance to the master the value of his apprentices. This happy result is no doubt owing in great measure to the personal character and influence of the professors whom it has been the good fortune of the college to secure.

I would not willingly offend against the decorum of modesty in speaking of those who are now present, but it must be acknowledged that if the college has been enabled thus to persevere in its work of reformation through good and evil report, and amidst discouragements of various kinds, it has owed much of the strength which it has shown to the zeal, to the learning and the perseverance—to the attractive, yet solid and practical lectures, and to the many amiable and excellent qualities of Drs Wood, Jackson and Ellis.

When the improvements which are now contemplated shall be made, and a hall, fitted up with every convenience, not merely for lecturing, but for teaching practical analytic chemistry, shall be built, we shall then increase our library and cabinet, and widen and deepen our course of instruction; and we may then hope by degrees to render the title of a Philadelphia apothecary but another name for a profound chemist and naturalist, and thus place our business where it ought to be, in the rank of the liberal professions.



Another department of the institution is the inspection which it professes to bestow upon the market for drugs and chemical preparations. Its influence in this respect has hitherto been of an indirect nature, although even as such it has been very considerable, for the general emulation which the establishment of the college has excited, has produced a scrutiny in the choice of medicines, and a care in their proper preservation, which already influence the market. It is by no means so easy as it was formerly to sell an inferior or sophisticated article; and higher prices are paid for medicines than could be obtained before the college was founded. A single instance will show the force of this observation. Twenty years ago almost the only kind of cinchona that was retailed in this city was the inferior variety brought from the Spanish main, and known by the name of Carthagena bark, which was only worth from ten to twenty-five cents per pound, and would have been burned by the public officers had it been sent to Europe. At the present time no respectable apothecary would offer bark of such a quality to his customers. Similar remarks will apply to many other drugs, and to almost the whole catalogue of chemicals. It is only recently that it has been esteemed essential to procure the mineral acids, ammonia, alcohol, and the ethers, of standard specific gravities, of strict purity, or to prepare the officinal formulæ by the officinal weights and measures. A spirit of accurate examination into the qualities of medicines, of honourable emulation to excel in the whole arrangement and ordering of our shops, has taken place of this sordid indifference, and is co-operating with the influence of the college to produce an entire change in the practice of pharmacy in this city. The greatest discovery which has ever been made in pharmaceutical chemistry—that of the new vegetable alkalies—and of the facility which the active principles of our most valuable medicines can thus be insulated, has been made at a period singularly happy in regard to its influence upon this spirit of improvement, for it has thrown open to the active and

awakening curiosity of our pupils a new field of investigation, in which the harvest of discovery that awaits the chemist will probably be more rich and copious than in any other department of chemistry.

It is now the third year since the system organised for granting our diploma has been carried into effect, and during each of those years there have been successful candidates for its honours. The trustees of the college have announced, in the regular course of their duty, that at the close of the last session of the school of pharmacy Charles Pleasants, William R. Fisher, Joseph Head Brook, Joseph Scattergood, John Allen, Franklin R. Smith and Robeson Moore, having completed the regular term of apprenticeship, and attended the requisite courses of lectures; having also each of them produced a written theme on some subjects of pharmacy or chemistry, and been questioned by the examining committee upon their attainments and qualifications, have been declared worthy of receiving the diploma of the college.

It is now my pleasing duty, in conformity with the directions of the college, to deliver to you this testimonial of your industry and acquirements. You will receive it, young men, I trust, in the spirit with which it is granted; not merely as a tribute of praise to that industry and docility which become the period of youth, but as an earnest of your future acquirements, and of the distinction which it may be in your power, by your learning and good conduct, to confer back upon the institution which thus honours you. You are entering upon the stage of life with peculiar advantages, which may influence the whole course and destiny of it, if you improve them as they deserve. The business to which you have devoted yourselves, is one that blends the humble offices of a shopkeeper, with the studies and researches of the scholar, so as to elevate and ennoble the one and to give a practical and useful character to the learning of the other. It is a business in which the strictest method, attention, patience and economy are indispensable for success; for it is a business the beginnings of which are small, the in-



creases thereof slow, although the end be safe and certain. You must always bear in mind that your reputation will be your capital in trade, and that it is reputation not merely of professional eminence, but in the highest and most comprehensive sense of the word, as a skilful apothecary—as a careful, prudent and steady citizen—as an honest, humane and upright man—which constitutes this capital, and which it should be the chief study of your professional life to deserve. In the ordering of your shops you should practice the strictest accuracy and method. It is impossible for you to err in the extreme on this point, for the lives of your fellow citizens are in your hands. The reputation of the medical profession is dependent in most cases upon our fidelity in preparing their prescriptions—and a single error of carelessness or ignorance may deprive you at one blow of the rewards and the promises of all your past labours, and be the means of plunging a family into the greatest distress, and an unprepared fellow creature into eternity. The responsibilities of our profession are indeed serious, and the saying of the illustrious Cullen is not less true of the apothecary than the physician—that it is his first duty to fear God.

The uncertain course of human events will probably bear some of you to distant lands, and scatter you widely from each other and from your preceptors. Wherever and under whatever circumstances you exercise your profession, endeavour to bear in mind the circumstances of this evening. Consider them as a pledge rendered to your instructors, to the college of pharmacy, and to your fellow citizens, for your future honourable conduct, your professional integrity, and the lustre which it is in the power of every one of you by patient scientific research and investigation to shed upon that institution for which, wherever your lot may be cast, I trust you will always entertain feelings of lively gratitude and affection.

*On the Virginia Snake Root, and the genus Aristolochia.*  
*By Daniel B. Smith.*

The publication committee having obtained from the proprietors the use of a set of very faithful and spirited engravings, executed from drawings by Dr W. P. C. Barton for his Medical Flora of the United States, design to publish an engraving in every future number of the Journal, and to accompany it with an original memoir. In these memoirs little further will be attempted than to compile, from the most authentic sources, a full, yet concise history of the plant, and it is thought that by bringing into one view the botanical and chemical characters, and the pharmaceutic history of our indigenous vegetables, the practical usefulness of this Journal may be much increased. The subject which has been selected as a specimen of the engravings, and of the manner in which it is proposed to compile the memoirs, is one of the most valuable and well established of our native remedies. The wide range of country over which it is to be found will render the engraving particularly useful, as it will enable the apothecary to detect this well characterised species in almost every forest of the middle, western, and southern states.

*Aristolochia Serpentaria.* L. sp. pl. 1363.

Pursh. Fl. Am. Sep. II. 596. Barton Med. Flor. II. 41, Nuttal. Gen. Am. Pl. II. 199. Torrey Comp. 323. London Encyclo. Pl. 13022:

Serpentaire de Virginie, (F.) Schlangenosterluzey, Virginienosterluzey, Virginische Schlangenwurzel, (G.) Slangrod, (Dan.) Ormrot, (Swed.) Wezownik Wirginianski, (Pol.)

*Aristolochia.* Gynandria Hexandria. (Lin.) nat. order. Aristolochiæ. *Jusseiu.*



FOLD

OUT

HERE

!





*Calix*, none. *Corolla* one petalled, ligulated, with a ventricose base. *Capsule* six celled, many seeded, inferior. *Nuttal*.

A. *Serpentaria*. "Leaves alternate, petioled, cordate-lanceolate, acuminate, *three nerved*. Peduncle subradical, one flowered, with ovate bractes. Cal. none. Cor. purplish, tubulous, limb three cleft. Seed many. Root fibrous aromatic. Capsule six angled, fuscous, six celled, divided to the base by six valves. Flowers in June; ripens in August. —*Muhlenberg's MSS. Flor. Lancast.*

A. *Serpentaria*. "The root is extremely fibrous, and sends up a number of stems, simple, or slightly branched, less than a foot in height, jointed, flexuous, and often of a reddish tinge. Leaves alternate, on short petioles, oblong, entire, acuminate, heart-shaped at base, and three nerved. The flowers grow close to the ground; they have a stiff, leathery texture, and a dull brownish purple colour.

"The peduncle has one or more leaflets, and gradually enlarges into a furrowed obovate germ. The corolla consists of a long, contorted tube, bent in the form of the letter S, swelling at its two extremities, having its throat surrounded by an elevated edge or brim, and its border expanded into a broad, irregular margin, forming an upper and an under lip, which are closed in a triangular manner in the bud. Anthers twelve, growing in pairs to the sides of the fleshy style, which is situated at the bottom of the corolla, and covered by a firm, spreading, convoluted stigma, which extends over the anthers. Capsule obovate, six angled, six celled, with numerous flat, small seeds. Woods near New-Haven. June. Perennial."—*Bigelow's Plants of Boston, 2d edition, 1824.*

Pursh says, "I have seen a very narrow and long leaved variety of it, which, if there were any difference in the flowers, might claim to be a distinct species."

The Virginia snake root which is found in commerce appears to be gathered indifferently from the *A. Serpentaria*, the *A. Tomentosa*, (*A. Hirsuta*, *Muhl.*) the *A. Hastata*, the *A. Sagittata*, (*Muhl.*) and perhaps some other species, if, as is asserted by Rafinesque, (*Med. Flor.*) there are several species having similar leaves, but differing in their inflorescence, which are all called *A. Serpentaria*. It may reasonably be doubted, whether the love of minute distinctions has not led this zealous naturalist into an error; and whether even some of the species above enumerated are not mere varieties that pass insensibly into each other, and belong to the officinal species. Barton says, that "on an examination of the species in the Muhlénbergian Herbarium, the *serpentaria*, *hirsuta* and *sagittata* appeared very closely allied; and on tasting and smelling the roots, I could perceive no difference in their sensible properties." *Med. Flor.* II. 45. In examining several parcels of the dried snake root in the shops, I was able to distinguish three distinctly characterised forms of the leaves. One of these was that of the true *serpentaria*, which is marked, as may be seen in the plate, by the margins of the leaf running parallel for about half the length. In another parcel, which was collected in the southern states, there was a considerable mixture of leaves precisely agreeing with the figures 6 and 7 of the plate, which are the *sagittata* of Muhlenberg and the *hastata* of Nuttall. In several other parcels, all of which were collected in the western states, I found many leaves approaching to the form of those of the *hirsuta* or *tomentosa*. They are distinctly marked as roundish cordate, with none of the parallelism which characterises the true *serpentaria*. In another parcel from the state of Tennessee, the *hirsute* leaves and stalks left no doubt as to their being the true *tomentosa* of Nuttall. There was no perceptible difference in the taste or smell of the roots in these parcels, but I thought I could distinguish that those of the *A. Hirsuta* were smaller and more branched and fibrous. Dr Anthony Todd Thompson asserts, in his London Dispensatory, that the *serpentaria*



brought to London is mixed with the roots of the *collinsonia praxifolia* of Walter, (the *scabra* of Pursh, and closely allied to, if not identical with, the *scabriuscula* of European botanists). This plant is a native of Florida and the southern states. I am not acquainted with the form of the root; but the quadrangular stem, the ovate opposite leaves, and the whole habit of the plant, which is one of the *Labiatae* of Jussieu, are sufficient to distinguish it where the leaves are mixed with the roots, which is often the case.

I am ignorant of Dr Thompson's authority for this assertion; but as almost all the snake root brought to our market is the growth of Ohio, Kentucky, Indiana, Virginia, and western Pennsylvania, where the *C. Scabra* is not found, I have not met with this adulteration in Philadelphia.

It is asserted in the *Dictionnaire des Drogues*, article *Serpentaire de Virginie*, that the snake root is sometimes adulterated with the roots of the *Asarum Virginicum*. I suspect that the only authority for this assertion is to be found in the little tract of Schoepf, entitled "*Materia Medica Americana, potissimum regni vegetabilis*," published in 1787. In this work he says, "*Asarum virginicum olim pro serpentar. virginica in anglia vendebatur.*" P. 73. Whatever may have been the case previous to the year 1786, this sophistication is certainly now no longer practised. The roots are easily to be distinguished by their black colour, and their different mode of growth. The *asarum* is however closely allied to *aristolochia* in its botanical and medicinal properties, and belongs to the same natural family of plants.

In a parcel of snake root from the state of Tennessee which is now before me, there is a large mixture of the roots and stalks of a very different plant. These were easily recognised by their quadrangular stem, (becoming roundish near the root), by their opposite, brachiate, sessile, lanceolate, ovate, entire leaves, by the long linear segments of the persistent calyx, by the mode of inflorescence, and finally by the sweetish, subacrid and nauseous taste of the roots, to be



the *Spigelia Marilandica*. This is an important fact, and should render our druggists exceedingly careful in the purchase of their snake root, particularly when brought from those districts in our southern states, where the serpentaria and the spigelia grow together in great abundance. When the stems are mixed with the roots, it is easy to detect the sophistication by the eye; but it will require a closer examination to distinguish the roots by themselves. Their appearance is very similar, and it is only by the taste that we can assure ourselves of the genuineness of the snake root.

The chief part of the snake root sold here comes from Wheelan and Pittsburg, and is the growth of the valley of the Ohio. It grows on the hill sides and bottoms in great profusion, along with the *quinque panax folium*, the roots of which are often intermixed with it. Like the spigelia and the polygala, it is often very imperfectly cleaned from the leaves and dirt, so that it is rarely that we meet with a bale that is in a proper state for the use of the apothecary.

The *A. serpentaria* is a native of the whole middle and southern sections of the United States; it flowers in May and June, and ripens its seed in September. The root is perennial, consisting of numerous small fibres of a brownish yellow colour, attached to a short, contorted, knotty, horizontal caudex. These fibres become brown by drying. From these roots rise several stems about eight or ten inches in height; slender, round, flexuose and jointed; supporting at each joint an oblong, cordate, acuminate, entire leaf of a pale yellowish green colour. The flowers proceed from the joints near the root, and stand upon long, slender, jointed peduncles, which are sometimes furnished with small scales, and are curved, so as nearly to bury the flower in the earth and decayed leaves.

There is no calyx; the flower is solitary, monopetalous, tubular, contracted and curved in the middle; of a brownish purple colour, and terminating in an irregular lip. The six

anthers\* are sessile, attached to the stigma, which is roundish, divided into six parts, almost sessile, rising from an oblong, angular, hairy, inferior germen. The capsule is hexangular, six celled, and contains several minute flat seeds.

The ordinary price of snake root is from fourteen to sixteen cents per pound, and it is brought to market in bales, containing from two to five hundred weight.

Virginia snake root has a strong odour, somewhat like camphor, and a bitter pungent camphorated taste. Bucholz, a German chemist, analyzed this drug and obtained

|                       |       |
|-----------------------|-------|
| Volatile oil          | .05   |
| Yellowish green resin | 2.85  |
| Extractive            | 1.7   |
| Gummy extract         | 18.1  |
| Woody fibre           | 62.4  |
| Water                 | 14.55 |

The analysis of M. Chevallier gave the following results—volatile oil, a yellow bitter principle, soluble in water and alcohol, resin, gum, fecula, woody fibre, albumen, and malic and phosphoric acids, partly combined with potash.

Water extracts its sensible qualities, and the infusion is not altered by sulphate of iron or zinc, nitrate of silver, bichloride of mercury, tartarized antimony, the mineral acids and alkalies; nor is it precipitated by gelatine or tannin. The superacetate of lead throws down a flocculent precipitate, insoluble in acetic acid, showing the presence of mucus. The alcoholic tincture is of a bright greenish colour, and becomes turbid by the addition of water.

“On distillation a white pearly fluid collects in the receiver, strongly impregnated with the aroma, but less bitter than the root. This fluid on standing deposits round the edges of its surface small crystals of camphor.”—*Bigelow's Mat. Med.* p. 337.

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\* Bigelow's plant is from the southern states, and has twelve anthers.



C. Recluz obtained from 25 lbs. of the dried root 2 oz. 70 grs.\* of essential oil, of a green colour, and having a very fragrant odour resembling that of cajeput oil.

The Virginia snake root is much used in pharmacy, and enters into the composition of many extemporaneous preparations. In preparing these memoirs of indigenous plants it is designed to give an abstract from the article on the same subject, in the very valuable "Pharmacopée Universelle" of Dr Jourdan. His abbreviated references to the authors and works cited will be adopted and used generally hereafter in this Journal. The table of those abbreviations is given at the end of this number. Adopting this plan, we shall enable our readers to understand the language and prescriptions of foreigners. May the pharmacy of our country acquire the enviable distinction of knowing and proving whatever others have written, and selecting and appropriating all that is valuable from these foreign stores for its own use!

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*Decoctum Radicis Serpentariæ Virginianæ, (ra).*

R.—Rad. serpentariæ virginianæ ʒj.

Aquæ

℥ij.

The formula does not state the manner of preparation.

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*Infusum Radicis Serpentariæ Virginianæ, (am. b\*. ww. c. sa.)*

R.—Rad. serpentariæ virginianæ ʒij. ad ʒiv.

Aquæ bullientis

q. s.

To obtain 6 oz. of the filtered infusion (b\*.) ww. prescribes  $1\frac{1}{2}$  oz. of the root and  $1\frac{1}{2}$  lb. of water; am. and c. half an ounce of root, half a pint of water and two hours of maceration.

The dose is one or two table-spoonsful every hour.

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*Infusum Cardiacum seu Alexiterium, (sa. sw).*

R.—Rad. serpentariæ virginianæ.

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\* The French drachm contains 72 grains, the pound 6912 grains.

Rad. dorsteniæ contrayervæ a. a. ʒij.

Aquæ bullientis ʒxij.

Macerate for two hours, and add to the strained infusion.

Tinctura pimente ʒiv.

Dose.—Four table-spoonsful every six hours.

*Infusum Cardiacum Acetatum.* (sw.)

R.—Infusi Cardiaci ℥j.

Aceti ʒij.

Dose.—Four table-spoonsful every six hours.

*Tinctura Serpentariæ Virginianæ*, (am. ams. b. be. du. ed.  
han. lo. o. s. w. c. vm.)

R.—Rad. Serpentariæ Virginianæ 1 part.

Alcohol (15°) . . . 6 parts.

Digest for several days and filter. (b. be. vm.) ams. directs one part of root and eight of alcohol (0.907);—du. ed. lo. and c. three ounces of root and three pints of alcohol (0.930;);—s. one part of root and four of rectified alcohol; han. five ounces of root and two pounds of alcohol;—o. three ounces of root and two pints of brandy;—w. two ounces and a half of root and one pound of alcohol;—am. two ounces of root and three pints of alcohol; ed. two ounces of root, two and a half pounds of alcohol (0.935) and one drachm of cochineal.

Dose.—Thirty to fifty drops and upwards.

*Extractum Aristolochiæ*, (br. w.)

R.—Rad aristolochiæ ℥j.

Alcohol ℥v. ad ℥vj.

After sufficient digestion press and filter; digest and then boil the residue for a short time with three parts of water; clarify the decoction with the white of an egg; mix the two liquids, distil off the alcohol and evaporate the remainder to the consistence of an extract.

The serpentaria also enters into the confectio opii, and



the tinct. cinchon. compositæ of the British and American Pharmacopœias.

The serpentaria is much used, in combination with cinchona, as a remedy in intermittent fever. The following formula has been extensively sold as "a fever and ague powder :"

R.—P. cinchonæ flav. 3ss.

P. serpentariæ virgin. 3ij.

Carbonat. potassæ pur. 3j.

This quantity is to be taken during an intermission of the fever, of which the serpentaria is an ingredient.

The following other species of aristolochia are introduced into the foreign Pharmacopœias :

1. *Aristolochia Pistolochia*, Linn. (e. w. g.) *Netzblatthohlwurzel*, (G). *Aristolochie Crenelee*, (F.)

A perennial plant of southern Europe and Switzerland. The part employed is the root (*radix pistolochiæ* s. *aristolochiæ polyrhizæ*,) which is composed of numerous slender fibres, about six inches in length, of a yellowish grey colour, proceeding from a small head or caudex. It has an aromatic and agreeable odour, and an acrid bitter taste.

2. *Aristolochia Clematitis*, Linn. (br. f. fe. fu. g. r. w. wu. g. m. sp. z.) *Waldrebeosterluzy*, *Waldrebenhohlwurzel*, (G). *Aristolochie des Vignes*, *Clematite*, (F).

A perennial plant, a native of the temperate and warm regions of Europe.

The part employed is the root (*radix aristolochiæ vulgaris*, s. *creticæ*, s. *tenuis*) which is long, cylindrical, simple, fibrous, contorted, of the thickness of the little finger, smooth, of a reddish or brownish yellow on the exterior, within white or yellowish. It has a weak and slightly disagreeable odour. Its taste is sharp, very bitter, astringent, and remains long in the mouth.

3. *Aristolochia longa*, Linn. (ams. br. e. f. li. p. w. wu. be. br. g. m. sp.) *Langosterluzey*, *Langhohlwurzel*, (G). *Aristolochie longue*, (F). *Long Birthwort*.

A perennial plant of the south of Europe.

The part employed is the root, which is sometimes a foot long and as thick as the finger. It is wrinkled, of a clear brown without, and yellowish within. Its odour is very weak, its taste acrid, bitter and nauseous.

4. *Aristolochia Rotunda*, Linn. (ams. b. br. e. f. fe. han. li. o. pr. su. w. wu. be. br. g. m. pid. sp. z.) *Runde Osterluzey*, *Rundhohlwurzel*, *Gebärmutterwurzel*, (G). *Aristolochie Ronde*, (F). *Round Birthwort*.

A perennial plant of southern Europe.

The part employed is the root, which is almost globular, heavy, compact, tuberous, brownish and somewhat wrinkled externally, yellowish within. It has a strong disagreeable smell when fresh, but becomes almost inodorous by drying. The taste of the fresh root is acrid and bitter and remains long in the mouth, but becomes feeble and nauseous in the dry state.

5. *Aristolochia Trilobata*, Linn. (r. be. m.) *Dreyklapphohlwurz*, (G). *Aristolochie Trilobée*, (F.)

A perennial plant, a native of Surinam and Jamaica.

The part employed is the twigs, (*stipites aristolochiæ trilobatæ*), improperly called the roots. They are long, angular, grooved, brittle, of a brown colour, and the thickness of a straw. They have a strong camphorated odour, and a strong, very bitter and aromatic but disagreeable taste.

The virtues of this species are said to be superior to those of the serpentaria.

The dose is from five to twenty grains.

There is another native species of aristolochia, which has been used in medicine, viz: the aristolochia siphon, (Dutchman's pipe,) of which the stems and bark are said to possess virtues similar to those of the serpentaria.



*On the Chlorides in General, and especially on those of the Oxides of Calcium and Sodium. By Elias Durand.*

The late introduction of the chlorides of lime and soda into the materia medica, as therapeutical and disinfecting agents, and the numerous and successful experiments which have of late been made with them in contagious diseases, have rendered these products highly important to the people of the United States. Our chemical manufacturers and pharmacutists, either from want of industry or of the opportunity of becoming acquainted with the processes of their preparations, with their strength and therapeutic employment, have suffered to this day, almost without any opposition, the importation of foreign liquid chlorides, the extravagant prices of which have rendered the acquisition of these valuable agents almost out of the reach of the great majority of the public. From such causes, very few experiments have as yet been tried in this country, and the beneficial properties of the chlorides are still unknown to the greatest number of professional men and to the community. Thus the disinfecting liquors of Labarraque and Fincham have obtained popularity in the United States, and a reputation they undoubtedly deserve, but which our own preparations, timely offered to the public, would have also commanded.

However, experience has already taught us how difficult it is to change the current of public opinion, when it has once found a good channel; and in many similar instances we have let prejudices arise in favour of foreign articles, long before we thought even of venturing our own products. This want of industry, or of self confidence, has undoubtedly been very prejudicial to our interests and reputation, and we ought now to be fully awake to the new discoveries, daily made in the different branches of our profession and turn them to our own advantage and credit, by preparing these articles ourselves.

We sincerely hope that the diffusion of the present Jour-

nal among the pharmaceutists of the United States, will be the means of spreading professional and scientific informations, of raising our standing in society, and converting our habitual indifference into an active and successful emulation to follow our European brethren in the path they have opened to us. When we consider the numerous names which adorn the annals of European pharmacy, those of Margraff, Macquer, Newman, Bergmann, Sheele, Baumé, Parmentier, Brugnatelli, Van-Mons, Vauquelin, Trommsdorff, Robiquet, Pelletier, Caventou, Doërberner, Sertuerner, Labarraque and many others, we cannot help lamenting that we have as yet done so little for the advancement of our profession and reputation as a body.

The alkaline chlorides yield so gradually their chlorine to the ambient atmosphere, that they are in no way injurious nor annoying to the patients. This gaseous evolution is partly generated by the carbonic acid gas of the air, and that produced by the decomposition of vegetable and animal matter. This acid being endowed with a greater degree of affinity for the alkaline bases than chlorine itself, the latter is evolved, and the alkaline chloride is converted into a carbonate. Chlorine, possessing a great power of combination with hydrogen, another of the products of vegetable and animal decomposition, all putrid emanations are thus decomposed and finally destroyed. It is on this chemical action, as has been proved by Mr Gaultier de Claubry, that depends the efficacy of the alkaline chlorides in purifying an atmosphere loaded with pernicious effluvia, arising from disorganized matter, or generated in certain putrid disorders.

As it will be seen at the end of this article, the exhibition of the chlorides of lime and soda, as disinfecting and therapeutical agents, are very numerous and frequent, and they have, besides, been advantageously employed in the arts, and in rural and domestic economy. Their properties have been so well established in France particularly, as to entitle them to a high station among the most important of the articles of the materia medica. It is in the view of fostering, in Ame-



rica, the knowledge of their properties, preparations and employments, that I now offer to the public the following compilation, which I have derived from the best sources, and principally from the Dictionnaire des Drogues, from the last editions of Turner's Chemistry, of Thenard's Treatise on Chemistry, from the Annales de Chimie et de Physique, and other chemical works of equal standing.

*On the Chlorides in general.*

The word *chloride* has been applied to substances resulting from the combination of chlorine with simple or compound bodies. The chlorides are divided into two classes, viz: the *chlorides of pure metals* and *those of the oxides of metals*. The former are afforded by the union of chlorine with all, or almost all, the pure metals, and the latter, by the combination of the same gas with several of the metallic oxides. Chlorine possesses a powerful affinity for pure metals, and its attraction for them surpasses even that of oxygen; on the contrary, very few of the metallic oxides are capable of combining with chlorine, and their power of combination is so feeble that the compounds resulting from their union with this body are easily decomposed, even by the weakest acids. The chlorides of metals are very numerous, whilst those of the oxides are but few in number; of the latter, the chlorides of the oxides of barium, calcium, sodium and potassium, are the only ones, the existence of which is now well ascertained; however, Mr Grouvelle asserts that he has produced those of the oxides of magnesium, zinc, copper and iron.

Metals combine in various proportions with chlorine, and form protochlorides and deutochlorides. The quantity of chlorine required by metals to form chlorides, has been compared to the proportion of oxygen absorbed by metals to constitute metallic oxides, and it has been ascertained that the quantity of chlorine contained in the chlorides, is to that of oxygen contained in the oxides as 4,388 is to 1; consequently, a metal requiring one proportion of oxygen to be

converted into the state of oxide, will need 4.388 proportions of chlorine to constitute a chloride.

The chlorides of oxides are distinguishable from the chlorides of pure metals by this particular feature, that they possess several of the properties of chlorine gas, such as destroying vegetable colours, dissipating putrid matters, emitting chlorine, when exposed to the air, &c.

*Chloride of oxide of calcium.*—(*Chloride of lime, oxymuriate of lime, Tenant's bleaching powder.*)

It is difficult to trace with precision the time of the discovery of this compound. It was first prepared on a large scale in the city of Glasgow in 1798. Tenant manufactured it afterwards and obtained a patent for its preparation and employment in the art of bleaching. The composition and properties of this chloride have since been carefully investigated by Dalton, Thomson, Walter, and more recently by Dr Ure and Grouvelle, who have made us acquainted with their experiments and the analysis of this compound. It appears from the latter, that the common commercial bleaching powder is composed of thirty-six parts, or one equivalent of chlorine, and twenty-eight parts, or one equivalent of lime, and that the essential ingredient is mixed with variable quantities of hydrate of lime.

As we have just stated, the chloride of lime was first employed for bleaching, but this article has of late acquired a greater celebrity from the labours of Mr Labarraque, a Parisian pharmacist, who demonstrated its usefulness as a disinfecting agent. Dr Massuyer, professor of chemistry in the medical school of Strasburg, and chief surgeon to the military hospital of that city, seems to have been the first who, in 1807, employed the dry chloride of lime for neutralizing the miasmata of hospitals. Borries, an apothecary of Montpellier, proposed in 1822, the lotions of the aqueous solution of this compound as a preventive in contagious diseases; but at the same time Mr Labarraque was applying the chlorides, as disinfecting agents, to the manufacturer of cat-gut



with a success which deserved from the *Société d'Encouragement* of Paris, the premium this institution had offered for such a valuable discovery.

Mr Labarraque, encouraged by this first trial, applied successfully his disinfecting method to dead bodies, amphitheatres, dissecting rooms, &c. and proposed its employment as a medical agent. Experiments were soon made, and it was ascertained that the exhibition of the liquid chlorides proved very advantageous in dressing ill-conditioned sores, and removing the causes of asphyxia, produced by the emission of pernicious gases from drains, sewers, privies, &c. He recommended it as a preservative in *typhus nauticus*, and the various success derived from these applications secured to the author the premium offered by the French Institute, and in 1826 he was created a knight of the legion of honour.

The employment of the chloride of lime being attended with such happy results, its exhibition was farther extended, and Messrs Chevallier and Payen applied it to the disinfection of wells of privies; but the quantity required in this instance, rendering its employment too costly, these chemists undertook, in order to obviate this disadvantage, to mix it with lime, and succeeded by these means in effecting the disinfection on a large scale of a large well of an hospital privy. Chevallier applied it afterwards with the same success to putrid stables.

Assimilating to putridity the unpleasant odour and taste peculiar to alcohols of feculas and corn, several chemists proposed the employment of chlorides for depriving them of these properties; but until now, the greatest difficulty has been encountered in fixing the exact proportion of chloride to a determinate quantity of alcohol. However, there is hardly any doubt, but that, by repeated experiments with spirits of different qualities, this point will be attained, and that this discovery will prove as advantageous to the arts, as it will be profitable to him who succeeds in this undertaking.

*Preparation of the chloride of oxide of calcium.*

Several processes have been employed for preparing this chloride. We describe only the principal ones.

1. The chloride of lime is prepared on a large scale, by introducing chlorine gas into a chamber, constructed in a suitable manner, and furnished with wooden shelves, upon which thin strata of recently slaked lime are exposed. This chamber is provided with two opposite windows, by means of which the operator can ascertain whether the vapours of chlorine are absorbed by the hydrate of lime. A door is contrived in one of the sides, in order to remove the chloride when prepared. Opposite to this door is an opening, through which the chlorine is introduced into the chamber. The roof is provided with a hydraulic valve to open a passage to the gas, in case of too great a dilatation.

2. Another process was employed in 1816 at Jouy, which consisted in introducing some hydrated lime into a cylinder, furnished internally with rays of narrow and thin pieces of wood, and revolving upon a hollow axis, through which the chlorine passes. By the rotating motion given to the cylinder, the combination of the gas with the hydrate of lime is greatly facilitated. When the saturation is accomplished, the chloride is removed and preserved in well closed bottles.

3. Labarraque's process consists in filling up large stone pots of an elongated form, with a mixture of twenty parts of slaked lime and one part of muriate of soda, and introducing gradually chlorine gas into them. The operation is continued until the lime is sufficiently impregnated with chlorine; and this point may easily be ascertained by the appearance of the mixture becoming moist. This circumstance is a sure indication that the operation is drawing near to its end.

4. This compound may also be obtained by introducing slaked lime into a leaden cylinder, furnished with two bungs, one of which is provided with a tube intended for conveying the pure and washed chlorine into the cylinder, and the other with a second tube, bent at a right angle, with its inferior part plunged into a vessel containing milk of lime.



The latter tube is intended to open a passage to such portions of chlorine as would have escaped combination, and would otherwise be lost, and annoy the operator.

*Liquid chloride of oxide of calcium.*

*Solution of chloride of lime.*—This liquor, which may be used both for bleaching and disinfecting, is prepared in the following manner: Rub in a mortar a quantity of chloride of lime; add to it a small quantity of water, which increase gradually so as to form a liquid mixture; let the liquor rest; decant and pour more water on the residuum; unite these solutions of different degrees of concentration and bottle them up securely. Various proportions have been proposed for preparing this disinfecting solution. The principal ones are the following:

*Formula of*

|              |   |                                  |   |           |
|--------------|---|----------------------------------|---|-----------|
| Dr Massuyer, | } | Chloride of lime, 1 part; water, | { | 20 parts. |
| Labarraque,  |   |                                  |   | 48 parts. |
| Chevallier,  |   |                                  |   | 10 parts. |

These solutions, as may be perceived, contain very different proportions of chloride. When this liquor is intended for disinfecting, it may be saturated. The quantity of dry chloride contained in Chevallier's formula affords thirty-two hundredths of chlorine gas, acting as disinfecting agent by decomposing the miasmata evolved from the disorganization of animal and vegetable matters.

A liquid chloride of lime may also be obtained by introducing chlorine into milk of lime, and continuing the operation until the gas be in excess.

*Chloride of oxide of sodium.*—(*Chloride of soda, Labarraque's disinfecting liquor.*)

This preparation, as well as the chloride of lime, may be applied to the disinfection of dissecting rooms, hospitals, prisons, ships and other places, where a great number of people are crowded together, or containing matters capable of generating putrid emanations and thus altering the purity of the atmosphere. This liquor has also been successfully

exhibited as a therapeutic agent in the dressing of wounds and ulcers of the worst character.

Different processes have been proposed for the preparation of this chloride.

*Labarraque's Process.*—Dissolve 640 parts of crystallized subcarbonate of soda in 2500 parts of distilled water, and ascertain whether the solution marks 12° of Baumé's areometer for salts. If the liquor is not sufficiently saturated, add as much carbonate of soda as will be necessary to effect that object. If, on the contrary, the liquid is too dense, dilute it sufficiently. The solution thus prepared, the following substances are introduced into a matrass, viz: 147 parts of bruised muriate of soda and 112 parts of peroxide of manganese; apply a cork to the mouth of the matrass and place it on a furnace. A hydrostatic funnel for the introduction of the acid is adapted to the cork as well as a safety tube, bent at a right angle, and plunging by its extremity into a Woulfe's bottle with two necks, containing water, destined to wash the chlorine. From the second neck of the bottle emerges another safety tube, whose extremity plunges in the bottle containing the solution of carbonate of soda.

The apparatus being thus disposed, the joints are luted and the lute covered over with slips of linen soaked in the white of eggs, and sprinkled with slaked lime in powder. When the lutes are perfectly dry, introduce by small portions, through the hydrostatic funnel, a mixture of 147 parts of sulphuric acid and 112 parts of water.

When all the acid is introduced, put under the matrass a few ignited coals, and raise the temperature gradually, until the disengagement of chlorine ceases. This operation completed, take the apparatus apart and test the discolouring power of the product. Labarraque has ascertained that one part of this chloride, properly prepared, will discolour eighteen parts of sulphate of indigo\*. Should the quantity

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\* The sulphate of indigo alluded to by Labarraque is prepared by dissolving one part of indigo in six parts of sulphuric acid, and adding to the solution nine hundred and ninety-three parts of water.



of chlorine yielded by the mixture of muriate of soda and peroxide of manganese, and absorbed by the liquid alkali, be insufficient to give to the chloride this discolouring power, it must be charged with more chlorine, in order to afford this degree of saturation. Labarraque recommends particularly to repeat the trials for ascertaining positively the discolouring power of this chloride.

The nature of Labarraque's disinfecting liquor has been carefully investigated by Mr Philips, and principally by Mr Faraday. It appears from the experiments of the latter chemist, that, while the chloride of soda is the active principle of this compound, its properties are considerably modified by the presence of carbonate of soda. In order to obtain this preparation in a state of purity, he recommends this chloride to be made with caustic soda, or common subcarbonate of soda, but with a great excess of chlorine, in order to displace the whole of the carbonic acid.

Mr Faraday, without changing the mode of operation prescribed by Labarraque, has altered the proportions in the ingredients, and proposed the following formula as preferable to that of the French chemist. This alteration, as will easily be perceived, is calculated to afford a much larger proportion of chlorine, and a more concentrated solution of chloride of soda, than are obtained by Labarraque's process.

*Faraday's Formula.*—Dissolve 2800 grains of crystallized subcarbonate of soda in one pint and 28-100ths of water, and through the solution contained in Woulfe's apparatus, transmit the chlorine evolved from a mixture of 967 grains of sea salt, and 750 grs. of peroxide of manganese, acted upon by 960 grs. of sulphuric acid, diluted with 750 grs. of water. In order to remove any accompanying muriatic acid, the chlorine before reaching the alkaline solution is to be conducted through pure water, by which nearly one-third is dissolved; but the remaining two-thirds are fully sufficient for the purpose. This gas is readily absorbed by the solution, and from the beginning to the end of the process not a particle of carbonic acid gas is evolved; whereas, by ap-

plying an excess of chlorine, the carbonic acid may be entirely expelled.

The liquor prepared according to Faraday's process has all the characters of Labarraque's liquid chloride of soda. Its colour is pale yellow; it has a slight smell of chlorine, and its taste, at first sharp, saline and scarcely alkaline, produces at last a persisting and biting effect on the tongue, and it reddens the colour of turmeric paper. When boiled, no chlorine is disengaged, nor is its bleaching power perceptibly impaired. If carefully evaporated, it yields a mass of dense crystals, which, when redissolved, bleach almost as powerfully as the original liquid. When rapidly evaporated to dryness, the residue scarcely retains any chlorate of soda or chloride of sodium, but, notwithstanding, it has lost more than one half its bleaching power, and therefore a part of its chlorine must have been evolved during evaporation. This solution deteriorates gradually by keeping, chloric acid and chloride of sodium being generated. When allowed to evaporate spontaneously, chlorine gas is gradually evolved and crystals of carbonate of soda remain.

In some respects, the nature of this liquid is still obscure; but from the preceding facts, drawn from Faraday's experiments, two points seem to be established: 1. That it contains chlorine, carbonic acid and soda. 2. That the chlorine is not simply combined either with water or soda, for by boiling, the gas is neither expelled as it would be from an aqueous solution, nor does the liquid yield chloric acid and chloride of sodium, as when pure chloride of soda is heated. It may perhaps be regarded as a compound of chloride of sodium and bi-carbonate of soda. Its composition may be conceived by supposing that when chlorine is introduced in due quantity into a solution of carbonate of soda, it combines with half the alkali, while the remainder, with all the carbonate of soda, forms a bicarbonate of soda. Should this salt unite, though by a feeble affinity, with chloride of soda, both may derive a degree of permanence, which neither singly would possess. During spontaneous evaporation,



the tendency of the common subcarbonate to crystallize may occasion its reproduction and the disengagement of chlorine. These remarks, however, are merely speculative\*.

The liquid chloride of soda may be obtained easily, cheaply, and of an uniform strength, by decomposing the chloride of lime by the subcarbonate of soda, as has been proposed by Mr Payen.

*Payen's Process.*—This method, extremely simple, has been employed in the preparation of a liquid chloride, which has obtained in therapeutical exhibitions all the good results it was expected to afford. It consists in mixing one part of dry chloride of lime with twelve parts of water, letting the liquor settle during three hours in close vessels, filtering and washing the dregs with two parts more of water. On the other hand, dissolve, with a gentle heat, two parts of crystals of subcarbonate of soda in four parts of water, and let the solution cool. Then mix the two solutions together, taking care to stir the mixture well. A copious precipitate of carbonate of lime takes place, and the liquor, after settling, is decanted or filtered and bottled up securely. This liquor is the pure chloride of soda. The precipitate may be washed with water, if desired, and a weaker solution obtained, which may be employed to dissolve a new quantity of chloride of lime for a second operation.

*General considerations on the utility and employment of the chlorides of the oxides of calcium and sodium.*

Under this head we will enumerate the principal instances in which the alkaline chlorides have been beneficially em-

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\* This theory is given in Turner's Chemistry, but from the experiments of Mr Gaultier de Claubry, to which we have alluded in the fourth paragraph of this paper, we are inclined to think that the formation of a carbonate by the spontaneous evaporation of the liquid chloride of soda, is principally produced by the decomposition of that compound by the carbonic acid of the atmosphere. We are so much the more inclined to this opinion, that the chloride of lime, prepared from the hydrate, undergoes the same decomposition, and produces also a carbonate of lime.

ployed, and will indicate the different modes of exhibiting them in the various circumstances requiring their employment. We will divide this article into five different sections, according as the chlorides may be applied to the *arts*, to *rural* and *domestic economy*, to *public salubrity* and *therapeutics*.

1. *Arts*.—They are employed for bleaching feculas, threads, linen, paper, and for the restoration of engravings and books soiled by smoke and stains. To attain this object, the body which is to be bleached is immersed in an aqueous solution of chloride, prepared with one part of the latter to twenty parts of water, and permitted to remain in it until it has acquired the desired degree of whiteness; after which it is washed several times in fresh water, in order to carry off the portions of chloride which might have remained attached to it.

2. *Rural economy*.—Germination is rendered more active by soaking the seeds, before sowing, in a mixture of one part of chloride and nineteen parts of water. By watering from time to time feeble vegetables with water containing one sixty-fourth of chloride, their power of vegetation is increased.

3. *Domestic economy*.—They are used for the preservation of eggs and other alimentary substances; to deprive vegetables, which are kept during the winter, of the unpleasant smell they may have acquired; and liquors of the taste they frequently derive from distillation or from their dregs; and, finally, to disinfect spoiled meat. For these purposes, the eggs are put into a solution of one part of chloride of lime in thirty-two parts of water, and moved from their place every now and then. Vegetables and meat which have acquired a disagreeable smell and taste are immersed several times in water containing one fortieth or sixtieth of chloride of soda, and then washed in pure water. As for liquors, they are mixed gradually with small portions of chloride until the chlorine begins to evolve, and when settled they are decanted and subjected to distillation, taking care to separate



the first products, which are always impregnated with chlorine.

4. *Public salubrity*.—It is principally in this respect that the chlorides become really valuable, by the numerous services they render to humanity in decomposing the putrid miasmata of every kind, and preventing the generation of epidemic diseases, or arresting their progress when they already exist. They are used for destroying the infectious smell arising from privies, sewers, chamber-buckets, putrid waters, &c.; for disinfecting hospitals, prisons, fish and meat market places, tanneries, muddy streets, paste-board pulp; for purifying the air of mines, the rooms where silk worms are raised, the manufactories of glue, starch, catgut, &c.; slaughter-houses, lumber yards, drains, stables, amphitheatres, meeting-houses, theatres, lazarets, the rooms of sick persons, wells, &c. Finally, in cases of disinterment of dead bodies for the purpose of judicial inquiries; likewise, for sprinkling over animals killed by contagious diseases; for washing the linen of sick people; for destroying the fetid emanations absorbed by cloths, and disinfecting the stores where second hand clothing is kept.

The manner of disinfecting articles in the state of putridity is by using a mixture of thirty or forty parts of water to one of chloride, and enveloping them in pieces of linen or cotton saturated with this solution, or by sprinkling them repeatedly and at small intervals with it. By these means the mephitic odours are promptly destroyed, and the danger which may result from them is thus removed.

In the beginning of the present year, 1829, the French government sent to Egypt, and different parts of Asia Minor, a committee of physicians charged to investigate the character of the plague which rages almost every year in those regions. The numerous experiments they had occasion to make with the chlorides has convinced them of the efficacy of these compounds, not only as preservatives from these dreadful diseases, but even as capable of removing the causes which generate it. By washing themselves with, and sprinkling on

their clothes the disinfecting liquor, they have been enabled to visit the hospitals, touch the sick, dissect the dead, and even to dress themselves, with impunity, with the shirts and wearing apparel of people who had died with the plague. In this last instance, they had previously immersed these clothes for sixteen hours in a solution of chloride of soda, and kept them on for eighteen hours, laying all the time in their beds. Although the clothes had been impregnated with perspiration, blood and pestilential matter, and were still stained with them, not a single one of these physicians had been in the least affected with disease twenty-two days after this daring experiment was performed.

From the success of the chlorides in these circumstances Dr Pariset, one of the principal physicians of that committee, draws the following conclusions: That the chlorides are capable, 1. Of disinfecting, at a trifling expense, all kinds of wearing apparel and goods infected with pestilence. 2. Of arresting at once a contagion, and destroying by lotions the poison produced by the first cases, and susceptible of spreading the infection. Dr Pariset has not the least doubt that not only pestilential disorders, but also varioloid, measles, typhus, and even yellow fever, may be arrested by means of the chlorides; and he concludes by asserting, that by these simple means, combined with a better police in the manner of burying among Mahometans generally, the plague will forever disappear from the surface of the globe.

5. *Therapeutics.*—Numerous applications of the chlorides have already been undertaken in a great number of diseases, and it is probable that their efficacy will render their employment still more extensive. It is at least what may be anticipated from the happy results obtained by the celebrated Dr Percy, and afterwards by Drs Marjolin, Jules Cloquet, Lisfranc, Cottureau, Segalas, Cullerier, Lagneau, Roche, Biett, &c. To these practitioners we are indebted for the knowledge we have acquired of the employment of the chlorides. They have been used to relieve asphyxia produced by gases evolved from the wells of privies, and to destroy the putrid



smell of the feet and breath. They have also been successfully exhibited in scurvy, scald head, itch and other affections of the skin; in madness, purulent ophthalmia, burns, chilblains, atonic and venereal ulcers, gangrenous sores, hospital gangrene, carbuncle, fistulous discharges, bastard blennorrhages, in ulcers of the uterus, cancers, &c. The chlorine evolved from the chlorides has, likewise, been beneficially applied to the affections of the organs of respiration. Dr Cottereau has invented an apparatus by which he introduces the chlorine into the lungs. This administration, though successful in the hands of experienced physicians, requires, however, the greatest attention and prudence in its exhibition.

In all these cases, the last excepted, the chlorides are exhibited externally. A mixture of forty parts of water, or of a mucilaginous decoction with one part of chloride is used at first, and the proportion of the latter is increased gradually, according as the sensibility of the organs diminishes, or the habitude of supporting its action requires it. The lotions are repeated from four to six times in the course of the day.

## Selected Articles.

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*Tartar Emetic. (Antimoniated Tartrate of Potassa. Tartarised Antimony. Tartrate of Potassa and Antimony.)*  
*By A. Chevallier.*

This salt is the result of the combination of tartaric acid with potassa and the oxide of antimony, in the following proportions :

| <i>According to Berzelius.</i> |       | <i>According to Thomson.</i> |       |
|--------------------------------|-------|------------------------------|-------|
| Potassa . . . .                | 12,53 | Potassa . . . .              | 16,66 |
| Oxide of antimony .            | 27,10 | Oxide of antimony .          | 36,81 |
| Tartaric acid . .              | 53,20 | Tartaric acid . .            | 46,53 |
| Water . . . . .                | 7,17  |                              |       |

We are indebted for the discovery of this salt to Adrian Mynsicht, who, in 1631, published an account of it in his treatise entitled "*Thesaurus Chimico-Medicus.*" Since that time many chemists, and among the rest Lemery, Baron, Bergmann, Lassonne, Macquer, Sheele, Fourcroy, Baumé, Lartigues, Henry, Soubeiran and Philips have investigated its properties and experimented upon its preparation. Bergmann described it with such accuracy, that his description would even at the present time be considered as excellent.

Many different processes have been attempted for the preparation of tartar emetic. Those described by Bergmann were founded upon the saturation of the excess of tartaric acid contained in the supertartrate of potassa, by the oxide of antimony afforded either by the white oxides or by the preparations of antimony known by the names of *crocus metallorum*, sulphurous, vitreous, &c. oxides. The different modes of prepara-



tion, according to Geoffroy, are productive of various combinations. This chemist published his experiments upon tartar emetic, and ascertained that this salt, obtained by different methods, was not identical, and contained from one eighteenth to one twenty-fifth of oxide of antimony.

Several processes are still used in the preparation of tartar emetic; those we are now going to describe are followed at the present time.

*Of the French Codex.*—Take sixteen parts of vitreous sulphuretted oxide of antimony (glass of antimony) well porphyrised, twenty-four parts of pulverised cream of tartar, and two hundred and forty parts of distilled water. When the powders are well mixed, place them in an earthen or silver\* basin, and pour on them a sufficient portion of water; reduce the mixture to an homogeneous paste, by stirring it with a wooden spatula, and add gradually the remainder of the water. Then set the basin on a furnace, and permit the mixture to boil for about three-quarters of an hour, stirring constantly, and adding every now and then a small quantity of boiling water to make up for that which has evaporated. When the ebullition is over, let the liquor cool to about 90° Fahrenheit; throw upon a filter, and wash the residue with tepid water. Afterwards unite the liquors, evaporate to 20° of Baumé's areometer for salts, and remove from the fire. On cooling, crystals of tartar emetic will form; they are often covered with other small acicular and radiated crystals of tartrate of lime, which are easily separated from the octoedral crystals of tartar emetic by means of a small brush, which removes the acicular crystals of tartrate of lime without altering the others†.

This salt, freed from the tartrate of lime, requires to be redissolved in distilled water, and the solution evaporated to

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\* When a silver basin is employed, the metal is partially blackened by the formation of a coat of sulphurated silver.

† Mr Idt thinks that the tartrate of lime may be removed by means of water slightly acidulated with hydrochloric acid.

the crystallizing point. If this recrystallization should not afford crystals perfectly pure and white, the same operation must be repeated. A new crop of tartar emetic will be obtained from the mother-waters, to be purified by the same means\*.

Several phenomena are observed during the formation of tartar emetic by the preceding process. 1. A disengagement of a small quantity of hydro-sulphuric acid. 2. The production of flocculent masses of a chesnut brown colour (kermes) floating in the liquor. 3. The solution acquires a greenish yellow colour, and frequently, when sufficiently evaporated, a gelatious appearance. These phenomena are explained in the following manner: the glass of antimony, which is a mixture of sulphuret and protoxide of antimony, &c. coming in contact with the water and cream of tartar, a part of the water is decomposed; its oxygen passes to the metal of the sulphuret, which is transformed into a protoxide, whilst its hydrogen, uniting with the sulphur, produces hydro-sulphuric acid. Part of this acid unites with a small portion of oxide of antimony, and forms kermes, the other is disengaged. The protoxide of antimony contained in the glass of this metal, and a part of the oxide produced in the operation, combine with the excess of acid of the cream of tartar, and afford tartar emetic, which remains in solution. The salt is united, 1. With a little tartrate of iron, by which the liquor is coloured green. 2. With silica, which, dissolved at first, is precipitated by the evaporation of part of the liquid in a gelatinous mass. 3. With tartrate of lime, separated by the protoxide of antimony from the cream of tartar, which contains always a small quantity of it. This calcareous salt, soluble in warm and insoluble in cold water, is precipitated in the form of needles on the octoedral crystals of tartar

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\* The tartar emetic afforded by the mother-waters is not fit for therapeutical employment, except when obtained in perfect crystals. In this state, it is always freed from the arsenic contained in the mother-waters, and furnished by the antimonial preparations from which the tartar emetic is obtained.



emetic. Mr Serullas asserts that the mother-waters contain, besides the above salts, a small quantity of arsenic. This process is also employed with some modifications in the proportions of the ingredients. Thus equal parts of cream of tartar and glass of antimony are used, instead of sixteen of the latter and twenty-four of the former\*.

*Philips' process.*—This process, published in France by Mr Henry, was repeated, in the presence of this gentleman, by Mr Pitay, one of the pupils of the *Pharmacie Centrale*, who inserted it in the *Journal de Pharmacie*. It consists in treating the subsulphate of antimony by the supertartrate of potassa, in the following manner: equal parts of subsulphate of antimony and cream of tartar, both finely pulverised, are mixed together and thrown, by portions, into ten parts of boiling distilled water. The liquor is maintained in the state of ebullition, until it remains but slightly troubled by a greyish and insoluble precipitate; it is then filtered and evaporated to 22° of Baumé's areometer for salts; afterwards removed from the fire and permitted to crystallize. When the crystals are formed (which requires about twelve hours) the mother-water is decanted, and the salt, generally white, is separated.

The mother-water is evaporated down to 22°. It is observable that, during this operation, and principally towards the end, the liquor becomes turbid. This phenomenon is owing to the precipitation of a certain quantity of sulphate of lime; the liquor must be filtered when still warm, and permitted to crystallize anew.

The mother-water of this second crystallization contains a great excess of acid, and requires, before undergoing eva-

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\*-This theory has been considered as accurate; but Mr Soubeiran, in some observations upon tartar emetic, published in the *Journal de Pharmacie* of October 1824, has opposed it, and concluded from the result of his experiments, that all the theory of the operation is confined to the saturation of the excess of tartaric acid of the cream of tartar, by the oxide contained in the glass of antimony, and that the production of sulphurated hydrogen and kermes are produced by the decomposition of a small quantity of the sulphuret of antimony.

poration, to be partly saturated with lime, (a small excess of acid is however necessary) otherwise the crystals would be impure, and covered with sulphate of lime. When the liquor has been filtered, in order to separate the precipitate, the operation is continued and new crystals produced. Should this last product prove not sufficiently white, it must be redissolved in pure water, filtered, and evaporated again to the crystallizing point.

Mr Pitay elucidates, in the following manner, the theory of this operation: "the sulphuric acid, possessing but little affinity for the subsulphate of antimony, this salt, coming in contact with the cream of tartar, is entirely decomposed: its oxide unites to the excess of acid of the supertartrate of potassa, whilst the sulphuric acid remains in solution in the liquor." Mr Soubeiran, who has since examined what happens in this operation, thinks that the theory of Mr Pitay is not accurate, and grounds his opinion upon having ascertained that the liquor resulting from the ebullition of the water with the cream of tartar and the subsulphate of antimony, contains not only tartar emetic and sulphuric acid, as Mr Pitay has asserted, but also some tartaric acid and sulphate of potassa\*. He then establishes this theory: "relatively to the mass, the sulphuric acid takes up a portion of the alkali of the cream of tartar, but the acidity of the tartaric acid liberated is not destroyed; its presence counteracts the action of the sulphuric acid, and the equilibrium is established only when the tendency of the sulphuric acid to combine with the potassa is counterbalanced by that of the tartaric acid to retain this base. In this hypothesis, which to me seems the expression of the truth, the liquor would contain tartar emetic, sulphate of potassa, and besides, sulphuric and tartaric acid in the free state." Mr Soubeiran's

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\* Mr Serullas having demonstrated that almost all the sulphurets of antimony which are met with in commerce contain some arsenic, this metal, modified, must necessarily exist in the mother-waters, or among the precipitates on the filters.



observations being of a length which does not permit us to produce them all in this place, we refer our readers to the author's memoir, published in the *Journal de Pharmacie* of October 1824.

In an essay published in the first and second volumes of the *Journal de Chimie Medicale*, by Mr Henry, chief of the *Pharmacie Centrale*, this eminent pharmacist has undertaken to ascertain the value of the different processes for obtaining tartar emetic, according to the various methods of Mr Philips, of the French *codex*, and of the Edinburgh, Dublin and London *Pharmacopœia*. The conclusions he has drawn from the results of his experiments are, 1. That Mr Philips's method, although it seems at first to possess advantages, is liable to the objection, that we never know exactly on what quantity of sulphate we are acting\*. In fact this salt, prepared according to the formula published by the author, contains always more or less metal, and, besides, the product seems to be contaminated by a pretty large quantity of bitartrate of potassa; 2. That the process of the French *Codex* requires a tedious manipulation to obtain crystals of pure tartar émetic, and although the expense seems but trifling, yet when we take into consideration the value of time and labour, we soon perceive that there is no advantage in adopting it; 3. That the two processes of the Edinburgh *pharmacopœia* can bear no competition. The author pronounces in favour of the Dublin formula, which consists in preparing tartar emetic with four ounces of subchloride of antimony, 4 oz. 2 drs. and 18 grs. of cream of tartar, and three pounds of water. The following is the Dublin process, modified by Mr Henry:

*Dublin process, amended by Henry.*—Sulphuret of antimony, 16 parts; hydrochloric acid, of 22°, 88 parts; nitric acid, 1 part. Introduce the sulphuret reduced to a very fine powder into a glass matrass of the capacity of at least

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\* The American Pharmacopœia has adopted the process of Mr Philips.

double the volume of the whole mixture; mix the two acids together, and pour about two or three pounds of this mixture upon the metallic powder, so as to wet it completely with the liquid; add then the remainder of the acids. Set the matrass on a sand-bath and carry the liquor to the boiling point over a moderate fire. A considerable disengagement of gaseous vapours takes place, which the operator should avoid; the ebullition is continued until the gas which is disengaged is sufficiently deprived of sulphurated hydrogen not to blacken a piece of white paper impregnated with a solution of acetate of lead. The liquor is then permitted to cool and settle until it becomes quite transparent; and to obtain the last portion, which is partly soaked by the residuum, the latter should be washed with a small quantity of hydrochloric acid, decanted and united to the former liquid. This solution will afford the Algarotti's powder (subhydrochlorate of antimony) which is produced in the following manner:

The solution is poured gradually into a large quantity of water, stirring at the same time so as to obtain a precipitate minutely divided, and capable of being washed more accurately. The following is the mode of ascertaining whether the quantity of water employed in this operation is sufficient: When the liquid chlorate of antimony has been thrown into the water, let the mixture settle; take some of the supernatant liquor, and if by pouring on it a fresh quantity of water it is not rendered turbid, all the salt has been decomposed; but should it continue to form a precipitate, it is necessary to add more water, in order to obtain the greatest quantity possible of subhydrochlorate of antimony. All the precipitate being obtained, it is washed repeatedly until the water which has passed over it contains no more acid, and does not redden litmus, or tincture of violet. The precipitate is then collected on a piece of linen and permitted to dry.

Take first, 100 parts of this dry antimonial powder; second, 145 parts of pulverised cream of tartar; third, about 1000 parts of water. Boil the latter in an iron kettle, mix



accurately both powders, throw them into the boiling water, and evaporate rapidly, until the liquid marks  $25^{\circ}$  of Baumé's areometer for salts; filter then the liquor and let it crystallize. Tartar emetic soon begins to form in the bottom, and in the course of twelve hours the crystallization is accomplished. The mother-water is decanted, and the tartar emetic, which generally does not require purification, is dried for use.

After having saturated with chalk the excess of acid contained in the mother-water, it is filtered and united with the liquor obtained by washing the paper which has been used in the first filtration, and the whole concentrated to  $25^{\circ}$ . Thus a new crop of crystals of tartar emetic is produced, and the mother-water, separated again and evaporated in the same way, afford yet a third crystallization. These two last products are slightly coloured by a small quantity of iron, and require to be purified by new crystallizations. It would be useless at this point to undertake to obtain more tartrate of antimony and potassa from the mother-waters; such as they would then afford would be contaminated with foreign salts. The whole of the details given by Mr Henry on this subject being too extensive to insert in this place, we refer our readers to his memoir published in the *Journal of Medical Chemistry*.

Tartar emetic is a colourless salt, more soluble in warm than in cold water. Boiling distilled water takes up one half of its weight, and cold water about one fourteenth. It crystallizes in octoedral and sometimes in tetraedral crystals, reddens litmus, and possesses a peculiar nauseous taste. In contact with the air it effloresces, and is decomposed by the action of heat; in this instance the tartaric acid is completely destroyed, and the residue is potassa and oxyde of antimony.

Taken internally tartar emetic induces vomiting, and proves poisonous in large doses. In this latter case, exciting the vomiting by administering large draughts of warm water, and tickling the larynx with the feather of a quill, are proper, and then astringent solutions prepared with nut galls,

oak, willow and Peruvian barks, tea, pomegranate, &c. are to be exhibited.

The principal tests of this salt are,

1. Sulphurated hydrogen, which produces in its solutions a red brown precipitate (kermes).

2. The hydrosulphates, by which similar precipitates are obtained.

3. The infusion of galls which forms a flocculent precipitate of a greyish colour. This precipitate, dried and submitted to the blowpipe is reduced to the metallic state, after having afforded the products resulting from the decomposition of vegetable matters.

4. The solution of tartar emetic is precipitated white by the hydro-ferro-cyanate of potassa, (hydro-cyanate-ferruré de potasse).

According to Henry's experiments, pure tartar emetic is not precipitated, 1. By hydrochlorate of baryta; 2. By the neutral oxalate of ammonia; 3. By the supernitrate of silver; and, 4. By the superacetate of lead.—*Dictionnaire des Drogues.* E. D.

*Observations on Sarsaparilla and its preparations, with incidental remarks on certain other remedial agents in the cure of obstinate chronical disorders. By John Hancock, M.D. Fellow of the Medico-Botanical Society, Vice President of the Philosophical Society of British Guiana, Corresponding Member of the Zoological Society, &c.*

The admirable effects, and consequent high price of the article in question, has induced the inhabitants of those countries from whence it is imported, to gather it from all the different species of smilax, the roots of which have any resemblance to the genuine sort, and even from some other plants of different families. Till a very recent period, the



people of Essequibo mistook for sarsa even the pendent fibres (*not roots*) of a species of climbing arum, with large heart-shaped leaves; and, however gross the error, I found certain medical practitioners there indulging in the belief of its being the genuine drug, and employing it as such! We cannot be surprised, therefore, to find the European market deluged with false kinds of sarsa, which sufficiently accounts for the little credit given it by many of the faculty, both at home and abroad.

Of the six or eight species of smilax which I have observed growing in the woods of Guiana, I never found but one to manifest to the taste any thing of the sensible qualities of the genuine medical sarsa; the rest being, for the most part, perfectly insipid in the mouth and fauces, and, as far as my experience goes, nearly inert as remedies. In reference, indeed, to medicinal powers, there are evidently two distinct divisions of this genus of plants, although we know of no botanical characteristics for thus distinguishing them into two sections. Botanical analogy seems entirely to fail us in this instance. It appears fully evident, however, that of this numerous genus but a very small proportion indeed are to be considered as possessing any very marked medicinal properties.

The species just alluded to, as possessing some active properties, grows on the declivities of the hills and mountains up the Essequibo, and doubtless in various other parts of the interior. The stem is round, armed with short curved spines; the leaves are oblong, pointed, distant, smooth and glossy; the root is a tuber, with numerous divergent fibres, of two or three lines in thickness, and several feet in length.

Unfortunately, the traveller's attention is absorbed by a vast variety of interesting scenes while traversing the Guiana forest, and he is prone to neglect special objects. I have no doubt, however, that the Rio Negro sarsa will one day be found growing abundantly within the limits of British Guiana; and whoever makes this discovery will confer

an inestimable benefit on the public. Not only this, but the discovery of the true ipecacuanha plant, and the cinchona tree, are amongst the important discoveries which may be anticipated in Guiana, either upon the plains, or on the range of its interior mountains. Such discoveries are to be expected from the *real* botanist, who combines a knowledge of the external forms of plants, with the more important science of their intrinsic properties, their application to medicine, to the arts, and domestic economy\*. I must here observe that, from my examination of samples of the genuine drug from the Rio Negro, as it arrived at Angustura, with parts of the stem adhering, it appeared that the species described by Willdenow, as the *smilax syphilitica, caule aculeato tereti aculeis axillaribus*, is not that which is regarded as the true and more active species, which has no axillary spines, and may therefore still be considered as a *nondescript* species. The natives, (the Mandavaces of Cassiquari,) of whom I made inquiry, denied that the true kind was to be found on the banks either of the Cassiquari, or the Guiana, as they call the Rio Negro. I placed the more reliance on this information, as these were *Peones* who had been employed in digging the sarsa, which, as they asserted, was chiefly obtained on the elevated lands of the Rio Imiquen, at Unturana and Caraburi. They acknowledged too, that, when the right sort was not found in plenty, they sometimes dug one or two others, which they esteemed to be nearly equal in quality.

The sarsa of the Rio Negro, which comes by way of Angustura, or of Para, is the best. Respecting this species, indeed, I can speak with confidence, having had very ample experience of its medicinal properties, especially in Angustura, where I lived nearly four years. It is the only remedy used for the cure of venereal affections, and many others

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\* The present would be a most favourable time for a botanist so inclined, to set about an enterprise of this nature, as he would find, in the enlightened governor, Sir Benjamin D'Urban, the support of a zealous and unaffected patron of science.



falsely considered as such, in the Orinoko ; not to mention its great power in rheumatism of long standing, and in a multiplicity of chronic complaints.

The sarsaparilla which is usually met with in the shops, however, is, for the most part, nearly inert, either from age, or being procured from various non-medicinal species. It should be taken from recent importations in the *roll*, and not that which is kept slit up, in the shops, which is very often quite useless. Good sarsaparilla has a peculiar nauseous acrimony when chewed ; and this is almost the only criterion we have for judging of its medicinal activity.

It is quite amusing to observe the diverse opinions respecting the nature and properties of this medicinal root. In Mr Rennie's Supplement, p. 384, it is stated, that "genuine sarsaparilla is covered by a brown or reddish bark, with a central woody portion, soft, white, and sometimes like starch. This part is useless, the virtues residing in the bitter principle of the bark ; and the more it inclines to a red colour, it is the richer and more powerful. The gray and dirty-brown sorts are not good. The best sorts come from Jamaica and the Brazils, called Lisbon sarsa ; the worst from Honduras and Vera Cruz. (Pope.)" Here, it would appear, that it is only the thin pellicle of bark, a sort of epidermis, which is allowed to possess any useful property ; and the *colour* of this pellicle is the only character called in for discriminating the different kinds, or for judging of their medicinal powers !

The fact is, the real and only criterion for knowing good sarsa, is almost universally neglected, viz. its sensible quantities in the mouth ; and which affords the best and most effectual guide for enabling us to judge of the intensity and value of vegetable remedies in general. It is by the taste and odour chiefly that we judge of good Peruvian bark, rhubarb, jalap, &c. ; and even the speculators about cinchona would be guided more by such tests, in choosing good bark, than by their hypothetical ones of glue and tan.

The medicinal properties of sarsaparilla, moreover, are not

confined to the bark so called, but are found to reside almost equally in all parts of the root, as the cuticle, woody, and farinaceous portions. This has been fully proved in Demerara, by the results of their separate administration in actual disease. The same will easily be believed by a trial of their sensible effects on the mouth and fauces.

The medicinal powers of sarsaparilla, I am inclined to believe, depend on a certain *acid* or *nauseous* matter, or on a principle similar to that of ipecacuanha, judging from its sensible qualities and clinical effects; and this acrimonious or nauseous matter, which I find to exist in the more active medicinal sarsa, is, in some measure, covered or concealed by its demulcent or mucilaginous particles, which may also contribute something to its curative powers, added to the diluting effects of the water employed. As sudorifics, their action seems to be similar. So also, in emetic properties, when the sarsa is taken in large doses, and not spoiled by long boiling. However this may be, I suspect that ipecacuhana might, in many cases, be employed with equal advantage where sarsa is indicated. This, however, I know from sufficient experience, that the powers of sarsaparilla are, like those of ipecacuhana, quite destroyed by long boiling. It is true, indeed, that the condensed vapour arising from both is perfectly insipid; but it is, with regard to ipecacuanha, well known that, "though the water distilled from it has scarcely any emetic effect\*," it becomes nearly inert by long coction; and precisely the same is true with regard to the sarsa.

After long boiling, indeed, the peculiar *odour* which rises abundantly on the coction of *good sarsa*, is almost extinguished. From the sarsa prepared in this way I found no sensible results upon any patient, nor were its peculiar nauseating, drowsy, and racking effects produced by a large quantity, although the decoction of six or eight ounces were tried at a dose.

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\* Murray's Mat. Med. p. 322.



These experiments having been carried to a sufficient length, most of the same patients recovered under the use of the sarsa, taken from the same parcels as before, but now prepared by simple maceration in hot water, *i. e.* affused in a boiling state, and kept near the boiling point for some hours. In all cases the sarsa was directed to be well bruised in large mortars, and in the mean time all other remedies were abstained from, which might, in any way, affect the result.

Knowing, then, the destructive effects of long boiling on this drug, we cannot wonder at the doubtful and discordant reports given of it by our medical and pharmaceutical writers, after they have directed it to be *boiled down to one half*, &c. which must truly render it very nearly useless and inert.

Another preparation, still more preposterous, appears to be exceedingly in vogue at the present time; that is, to boil down the decoction of sarsa into an extract. By this absurd practice, its virtues are still more completely destroyed. It is much to be lamented, that such vast quantities of this valuable root are thus thrown away in vapour, a *boiled*, if not a burnt offering, to the goddess of folly. On entering some of the shops in London, where this process is carried on upon a large scale, we find the rooms teeming with the effluvium, which may be regarded as the active principle, or, at least, as an element necessarily connected with it; since we find that, in proportion as we drive off this odorous principle by heat, we despoil this remedy of its active properties.

Mr Brande remarks, at page 404 of his very useful Manual of Pharmacy, that, "there is much difference of opinion respecting the activity of this extract, (as directed by the College), among those who admit the efficacy of other forms of sarsaparilla. It is certainly the worst preparation of that remedy, as it is usually met with, for it is *easily decomposed by heat*, and always suffers more or less during the protracted evaporation that is required." These remarks

are exceedingly just, and similar ones have been made by Murray and Thompson, yet they seem to be entirely disregarded by the practical pharmacutists, perhaps because they consider them not to be derived from actual experiment.

As prepared by the College directions, the extract must certainly be quite inert; and it would seem, that some presentiment was entertained of its inefficacy, for, by way of compensation as it were, it is directed to be given in the *decoction* of the root! But certain sages of our profession have assigned to this useless extract, and to that not less useless syrup of sarsaparilla which is prepared from the extract, their best offices, when, in prescribing the decoction, they say "*thicken* it with extract, and *sweeten* it with syrup!" We have seen those boasted extracts and syrups used in great quantity, and at great cost, but in vain; when afterwards a quart of the strong infusion has removed all the violence of the symptoms.

In speaking of the deterioration of sarsaparilla by long boiling, I have only insisted on that which depends on the loss of its active principles by evaporation; but that which arises from the action of the air and heat, during a tedious process of boiling, must, in a great measure, subvert its affinities, form insoluble compounds, and precipitate such of the active materials as may not be dissipated in vapour. It is doubtless the latter, however, or the evolution and loss of its volatile parts, which proves the most injurious.

The boiling *in vacuo*, as it is rather improperly termed (for we can scarcely consider it a vacuum where the space is continually occupied by the production of aqueous vapour), is said to be a vast improvement in the preparation of decoctions, extracts, &c. It doubtless will be an advantage where much boiling is *really necessary*, principally by avoiding the access of air, smoke, and sooty matter, by which the extracts will at least appear more clear and pleasing to the eye; but it will by no means obviate the main objection just stated to the process of boiling, while it is far too operose and expensive for general use; and if, as asserted, the at-



mospheric pressure be taken off, it will not only facilitate the evaporation of the water, but that of the volatile elements of the drug likewise. There is, however, no occasion whatever for boiling: if the drug be duly bruised or reduced to a gross powder, the affusion of boiling water and digestion therein, just below the boiling point, will extract the active properties of this or other vegetable remedies, as completely as could be done by the longest coction, and without the loss or dissipation of their volatile parts\*; and when required, it may be effected with a very small quantity of fluid, if a powerful press be employed after due maceration in hot water. The medicinal properties of dried vegetables, may thus be extracted as perfectly as could be done by expressing their juices in a fresh or green state. Those containing resinous principles, require, of course, a similar operation with alcoholic menstrua or proof spirit. This method would be the most expedient for procuring unaltered the native properties of all those remedies depending on volatile or fugacious principles, as in the narcotic drugs, or those containing essential oils, for example, hemlock, henbane, savine, &c.

Over such preparation as I have just deprecated, that employed by the Spaniards of the Orinoko is indisputably superior. There, it is prepared constantly without boiling, either by digestion in wine, or a spirituous menstruum, or by an infusion with water, allowing it to stand for eight or nine days exposed to the sun's rays, or by a fire side in the rainy season, and forming thus a strong vinous or fermented liquor. After my return from the Orinoko to Demerara, in

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\* It is the *ebullition* or *intestine motion*, caused by the heat, which elevates and drives off the aqueous vapour and the volatile parts of the infusion along with it. When at the temperature of 212, the water is progressively converted into steam at the bottom of the vessel, its elasticity or expansive power then overcoming the weight of the superincumbent atmosphere. By raising the heat, therefore, to the boiling point, we rapidly increase the evaporation, whilst the solvent power of the water remains nearly the same as when a few degrees lower.

January 1818\*, I had opportunities of trying its action on numerous patients in every way I thought proper; and I found, by a long series of experiments, that the fermented infusion was equally as efficacious here as in the Orinoko.

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\* Early in this year I published, in the Guiana Chronicle, the Spanish recipe for the Jarave, so called, or diet drink, after which the use of the sarsa became very general in the colonies. The following is a somewhat modified and improved form of this recipe:—Take of Rio Negro sarsa, bruised, 2 lb.; bark of Guaiacum, powdered, 8 oz.; raspings of guaiac wood, anise seeds and liquorice root, each 4o z.; mezereon, bark of the root, 2o z.; treacle, 2 lb.; and a dozen bruised cloves: pour upon these ingredients about four gallons of boiling water, and shake the vessel thrice a day. When a fermentation has well begun, it is fit for use, and may be taken in the dose of a small tumblerful twice or thrice a day.

The publication of the recipe, at least gave an impulse to the employment of sarsa in the colony. At first it was prepared according to the Spanish process, and which certainly produced the most beneficial results,—surprisingly so it might be said, for many spoke of it as effecting very extraordinary and unexpected cures, even in old invalids, or those who had been for a long time entirely crippled.

Some years afterwards, many were found to complain that they had not experienced that efficacy in the *decoction* which had been reported. It was soon perceived, on inquiry, that the persons who had been thus disappointed were, for the most part, those who had confounded the preparation with that of the old *decoction* of woods, prepared by long boiling.

The recipe, or formula, having been anonymously published in the gazettes, which are seldom preserved in Demerara, in a short time after no indication was left for recurring to it. Many people would send to the druggists' shops for the articles, and some not even knowing what was meant, would send for the *decoction of the woods*. They received the packages, of course, with a very small portion of the more active article, sarsa, (it being the dearest one), put up in the old way, and with the usual pharmacopœial directions, by which it was boiled till quite exhausted of all active properties. This affords an example of the dilapsus and neglect of many of the most valuable remedies from mere carelessness and inattention:

If intended for old and obstinate complaints, as leprous affections, elephantiasis, various anoinalous ulcerations, and foul disorders of the skin, there was added to the jug a solution of tartrate of antimony, with muriate of mercury and ammonia, viz. antim. tar. 12 grs. hydr. oxymur. 8 or 10 grs. mur. ammoniæ, 1 drachm. These three articles, being previously dissolved in a little water, are to be thrown into the jug, when the infusion has well begun to ferment, not before, as they would prevent the fermentation taking place. The addition of those active ingredients not only greatly enhances the alterative power of the vegetable infusion, but, at the same time, so effectually prevents its decomposition that it may be kept for a long time quite unaltered, even in a hot climate,—a circumstance of great moment where it is frequently required for a number of patients.



It appears to me very probable, that the acetous and alcoholic principles gradually evolved in the course of the fermentation, serve more effectually to extract the active properties of sarsaparilla than can be done by any other method we are acquainted with. There seems to be a certain fixed principle in the sarsa from Para and the Rio Negro (and probably in other kinds also), which is not so completely taken up or dissolved by boiling water; for after exhausting half a pound of this sort by two digestions, boiling, and pressure, I added to the dregs half a pint of proof spirit, and digested this with a gentle heat for a few hours in a close vessel, then affusing hot water to the amount of that taken off from the first boiling, and pressing again, I procured, by this last operation, about four pints of an infusion, which possessed the acrid properties of the sarsa, in a much higher degree even than that obtained by the first decoction with simple water.

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I once mentioned such a formula in conversation with a chemical critic, who in the fulness of his wisdom, scouted the idea of such a compound, and pronounced most dogmatically, that between the tartarized antimony and muriate of mercury, the *whole* would be *decomposed*! I merely requested he would try it and convince himself, but heard no more from him. The truth, is no change whatever occurs from this admixture. Where the articles of the solution separately employed, there would be a trifling decomposition in the vegetable infusion; but these three articles being first united, form the most effectual conservative compound which it is possible to devise, either for vegetable or animal substances; and they so bind the different elements as to render them, for a long time, quite inseparable from exposure to light and air.

For some fastidious and delicate people, a variation was, at times, requisite, in which case the infusion was taken by itself; and, in lieu of the above solution, very minute doses of calomel, or the grey oxide of mercury, with precipitated sulphur of antimony, in pills, were substituted, as a quarter of a grain of the former with half a grain of the latter, night and morning.

[To be continued.]

## Minutes of the College.

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At a meeting of the College, held September 29th, 1829, the following communication was read, and referred to a committee consisting of D. B. Smith, Geo. B. Wood, M.D. E. Durand, J. P. Wetherill, J. Farr, and J. Carter.

### *To the College of Pharmacy.*

The object of the present communication is, to call the attention of the College of Pharmacy to some circumstances connected with the preparation and sale of the *spirit of nitrous ether*. This valuable medicine is so extensively used in all parts of our country, and is prescribed by physicians in the treatment of so many diseases, that it is highly important it should always be found ready for administration of an uniform and unvarying strength and quality. It is however a fact, which though it may be regretted cannot be denied or concealed, that, owing to causes which will presently be adverted to, there is perhaps no one article of the materia medica which the sick man takes with as much uncertainty. There are, I believe, no means known by which the proportion of pure nitrous ether contained in any specimen of the article can be ascertained; consequently it can only be obtained of uniform strength by preparing it always with care by the same formulæ: but chemists have no standard for the preparation of this medicine, each using such proportions as he may think proper; and moreover, some of them prepare it of at least two qualities, making what they call a *strong* and a *weak* sweet spirit of nitre.



A further difficulty arises from the property which good spirit of nitrous ether possesses of being susceptible of copious dilution with alcohol and water, without the sensible properties of gravity, taste, and odour being altered in a corresponding degree—thus unfortunately inducing vendors sometimes to reduce its quality in order to meet the wishes of their customers in regard to price; and probably in some instances dilution is resorted to from an apprehension that the article which they procure may be *too strong*, for ordinary sale. As a consequence, this preparation may be found in the warehouses of our chemists and druggists at various prices, from fifty or more down to twelve and a half cents per pound, and probably varying in strength in degrees as great as indicated by the difference in prices. As a single instance of the great want of information which prevails with respect to the nature of this medicine, it may be worth while to mention that a southern druggist, who is also a practitioner, recently ordered from a manufacturer here, a quantity of “*good sweet spirit of nitre*,” with a limitation of ten cents per pound for the price!

The great imposition and uncertainty to which, in this state of things, physicians and patients are alike subjected, is obvious, as either one of all these varying preparations may be, and is taken to supply a prescription calling for spirit of nitrous ether.

I have been prompted thus to bring into view these facts, with which many members I am aware must be already acquainted, by a belief that the College of Pharmacy possesses the power of remedying the evil very materially, if not of removing it entirely.

It is suggested that this most desirable object might be effected if a formula for its preparation were established, and the college were to recommend that the article be always *sold as prepared, without any alteration*. That there would be a concurrence in such a measure by all the respectable manufacturers can scarcely be doubted; and the druggists and apothecaries, it is to be hoped, would generally be

willing to submit to some temporary inconvenience for the promotion of the public good.

The subject is accordingly respectfully submitted to the consideration of the college.

JOHN CARTER.

The committee made the following report to the meeting held November 24, 1829.

*To the Philadelphia College of Pharmacy.*

The committee appointed at the last meeting on the subject of sweet spirits of nitre, report that they have received the annexed communication from John Carter, respecting the mode of preparing it in the laboratory of John Elliot. They have made inquiry as to the formula used in other laboratories, and have reason to believe that they do not materially differ from this. A formula nearly similar is given in Coxe's American Dispensatory, as having been used in this city many years ago by a chemist in large business. In Dr Coxe's formula, neither the specific gravity of the alcohol nor of the spirit of nitrous ether is given. As the recipe before us affords a result nearly similar to that of the London and Edinburgh Pharmacopœias; namely, a spirit of nitrous ether, having a sp. gr. of .834; we recommend the publication of this recipe in the Journal of the College. This mode of preparing nitrous ether has been generally adopted in the German Pharmacopœias, some of which order a portion of black oxide of manganese, so as fully to acidify the whole of the nitrous gas disengaged.

Your committee cannot close this communication without noticing the practice of our wholesale druggists of diluting this spirit. The price at the manufacturer's of the standard quality is from thirty to thirty-five cents. But it is often ordered to be diluted twice, three times, and even four times its weight of alcohol and water. The ease with which the specific gravity of the genuine spirits of nitre dulc. can be attained by mixtures of alcohol and water, deprives us of the use of that test of its purity, and compels us to trust al-



most entirely to the fidelity of the chemist in preparing this important medicine. The committee may further point out the necessity of preserving spirits of nitre dulc. in small and accurately stoppered vessels. The apothecaries in Berlin are compelled by law to keep it in half pint bottles, and all that is found in larger quantities by the inspectors of medicines is condemned and forfeited. We have no such laws, happily, in America, but the careful apothecary will profit by the lesson.

Signed on behalf of the committee.

DANIEL B. SMITH.

*For making Spirit of Nitrous Ether.*—Into a copper still of eighteen or twenty gallons' capacity, furnished with a pewter head and worm, are put eighteen pounds of purified nitre, twelve gallons of alcohol of 34° Baumé, and 12 lb. concentrated sulphuric acid. The mixture is gently heated for about two hours, and the temperature then raised so as to bring over the spirit of nitrous ether in a small stream, and the distillation is continued until ten gallons are obtained. It is rectified by redistillation from a little hydrate of lime, or carbonate of potash or soda, adding about a gallon of diluted alcohol, so that ten gallons of the rectified article may be obtained. It is necessary to put the whole product into a large glass vessel, and mix by agitation, as the portions which first come over contain the largest proportions of nitrous ether. Previous to redistilling, the head and worm are well washed with water, as a little acid comes over in the first distilling and acts slightly upon the metal: when rectified it does not sensibly affect it. The spirit of nitrous ether thus procured has a specific gravity of .833 at 65 Fahrenheit, and when recently prepared does not fully redden litmus, though it renders it less blue.

J. C.

The committee appointed at last meeting report, that the Commencement was held on the evening of the 23d instant, when diplomas were delivered to the several candidates for the degree of *Graduate in Pharmacy*.

Some specimens of concentrated pyroligneous acid, acetate of lime, and acetate of soda, prepared at the laboratory of Mordecai and Samuel N. Lewis, were presented by them to the college.

The following gentlemen were duly chosen trustees at our semi-annual election :

Benjamin Ellis, M.D.; Algernon S. Roberts, Charles Schaffer, Jun. Samuel P. Griffiths, Jun. John Price Wetherill, Samuel F. Troth, George B. Wood, M.D. and William Hodgson, Jun.

A committee was appointed to revise the rules and regulations and by-laws of the college, consisting of Daniel B. Smith, Elias Durand, Samuel P. Griffiths, Jun. Edward Needles, and Charles Ellis.

*October 27.*—A letter from M. Robiquet, secretary general of the Société de Pharmacie of Paris, acknowledging the receipt of a letter addressed to him on behalf of this college by the secretary, together with a certificate of foreign membership, was read.

A report from the committee upon the constitution was read and accepted, and the revised constitution was laid upon the table.

*November 24.*—A letter from J. J. Virey, M.D. titular member and secretary of the Section of Pharmacy of the Royal Academy of Medicine of Paris, addressed to the members of this college, acknowledging the receipt of our certificate of foreign membership, was read.

A communication was read from Mr E. Durand, respecting the spontaneous formation of crystals in oil of turpentine, under the following circumstances:—A bottle containing a filtered solution of mustard seed in oil of turpentine, was exposed to the ordinary light and heat of the shop (the temperature about 60°) since 1826. A few weeks ago Mr Durand discovered on the sides of the bottle above the liquid a crop of crystals. These he collected, and a new crop soon afterwards appeared in the same situation. When washed with alcohol they presented the following characters:—In



shape, four sided prisms, perfectly white and transparent, from three to five lines long, almost tasteless and inodorous, and cracking under the teeth like native sulphate of lime. Specific gravity .950. Insoluble in water; soluble in alcohol, ether and alkalies. Reddened and decomposed by sulphuric acid, evolving the peculiar odour of decomposing turpentine. Decomposed by nitric acid. Heated over a lamp they readily fuse and vaporize; but if withdrawn in a fused state and cooled, they form beautiful tufts of perfectly white acicular silky crystals. In contact with the flame of a lamp they ignite and burn with a white flame, leaving no residuum, and emitting a thick black smoke, like that from the combustion of oil of turpentine. These crystals were very slowly formed. Light appears to have been essential to their generation, as another portion of the mixture kept in a dark place yielded none; and while that producing the crystals became more limpid and whiter, the other retained its yellowish hue. From several points of resemblance between these crystals and the oil of turpentine, Mr Durand is disposed to think that they are composed of the same elements as the latter, and that the mustard seed had no agency in their production. He thinks if the sulpho-sinapic acid discovered in these seeds by MM. Henry, Jun. and Garot, could have united with the turpentine, as hydrochloric acid does to form artificial camphor, the sulphurous smell would have been evolved during decomposition.

## Miscellany.

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The following communication has been handed to us by our friend, Mr E. Durand, but came too late for insertion amongst the original articles.

*Caoutchouc*.—Dr J. K. Mitchell, professor of chemistry in the Philadelphia Medical Institute, has discovered a mode of making sheet-caoutchouc, possessed of very remarkable qualities. It is eminently soft and pleasant to the touch, possesses very great extensibility, without the exertion of much force, and may be made so thin as to appear colourless and transparent, yet retaining considerable strength and tenacity. When a sheet is folded and cut, or when two pieces are laid together and cut with scissors, the cut edges adhere with considerable force, and indeed after some hours maceration, adhere as strongly as the rest of the sheet. In that way tubes, bags, socks, caps, luting joints, &c. water and air tight, may be made. Its impenetrability and softness render it applicable to the treatment of many local diseases, especially chronic rheumatism.

Its properties and uses are so very similar to those of the sheet-caoutchouc made by Mr Hancock of London, that the identity of them is highly probable. Mr Hancock conceals his process: but Dr Mitchell, more liberal, and confident that his discovery may be eminently useful to the whole world, has not hesitated a moment to divulge it, and has authorized me to publish in this Journal the experiments he has made in my presence, and which I have repeated with the same success. Dr Mitchell forms his preparation by



soaking the caoutchouc in ether until soft. In that state it may be cut into plates or sheets, with a wetted knife, without difficulty, or the sheets may be stretched to a great extent. If caoutchouc *bags*, so softened, be inflated through a stopcock by the breath, they are often expanded to a great size. One, now in Peale's museum, which weighs only seven ounces, measures six feet some inches in circumference. The inflated caoutchouc does not, when liberated from pressure, contract much.

Dr Mitchell has also discovered a very good solvent for caoutchouc. It is the essential oil of sassafras acting on the article after it has been softened by ether. This solution will, when dry, and it dries in a day or two, present a thin pellicle of pure caoutchouc, which can, by wetting it with water, be separated in a sheet from glass and porcelain. Applied to the surfaces of torn or cut caoutchouc, it causes their firm and inseparable adhesion. Silk treated with it remains *apparently* unchanged, but becomes water tight.

*Note.*—When very thin caoutchouc, prepared as above, is applied over the mouth of a glass jar, it adheres without the existence of any ligature, and permits, through its transparency, the inspection of the contents of the jar. As it is attacked by no insects, and cannot be gnawed by vermin, its protecting influence greatly exceeds that of any thing but glass itself. It has also the convenient quality of durability, the same pieces being susceptible of repeated applications, because very few chemical agents act on them.

E. D.

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*Explanation of the Abbreviations in the Pharmacopée Universelle. By A. J. L. Jourdan. Paris, 1828.*—As this work is a conspectus of all the most noted pharmacopœias in the world, and as we shall often have occasion to introduce some of its formulæ into our Journal, we thought it best to transfer the list of abbreviations prefixed to it entire to our pages.

The dispensatories and formularies are indicated immedi-

ately after the formulæ or medicinal substances resulting from them, by the following letters, after each of which will be found inscribed the title of the work it represents.

- a*—Pharmacopœia Austriaca. Erfurt, 1820, 8vo.
  - am*—The Pharmacopœia of the United States of America. Boston, 1820, 1 vol. 8vo.
  - ams*—Pharmacopœia Amstelodomensis Nova. Amsterdam, 1792, 1 vol. 4to.
  - an*—Pharmacopœia Manualis. Anvers, 1812, 1 vol. 8vo.
  - b*—Pharmacopœia Batava. Amsterdam, 1805, 1 vol. 4to.
  - b\** designates the additions and notes of Niemann.
  - ba*—Pharmacopœia Bavarica. Munich, 1822, 1 vol. 8vo.
  - be*—Pharmacopœia Belgica. The Hague, 1823, 1 vol. 4to.
  - br*—Dispensatorium Pharmaceuticum Brunsvicense. Brunswick, 1777, 1 vol. 4to.
  - d*—Pharmacopœia Danica. Copenhagen, 1805, 1 vol. 4to.
  - d d*—Pharmacopœia Militaris, oder ausgewählte Sammlung Arzneymittel fuer den Militair stand, 1818, 1 vol. 12mo.
  - du*—Pharmacopœia Collegii medicorum regis et reginæ in Hibernia. Dublin, 1807, 1 vol. 8vo.
  - e*—Pharmacopœia Hispana. Madrid, 1798, 1 vol. 8vo.
  - ed*—Pharmacopœia Edinburgensis. Edinburgh, 1813, 1 vol. 8vo.
  - f*—Codex Medicamentarius, sive Pharmacopœia Gallica. Paris, 1818, 4to.
  - f\** designates the additions of Henry.
  - f\*\** designates those of Fee.
  - fe*—Farmacopœia Ferrarense. Padua, 1825, 18mo, 10th edition.
  - ff*—Formulaire Pharmaceutique à l'usage des Hôpitaux Militaires de France. Paris, 1821, 1 vol. 8vo.
  - fi*—Pharmacopœia Fennica. Abo, 1819, 1 vol. 8vo.
  - fu*—Dispensatorium Fuldense. Frankfort on the Main, 1791, 8vo, 3d edition.
  - g*—Pharmacopœia Genevensis. Geneva, 1780, 1 vol. 8vo.
- Vol. I.—2 P



*ham*—Pharmacopœia Pauperum in usum Instituti Clinici Hamburgensis. Hamburg, 1804, 1 vol. 8vo.

*han*—Pharmacopœia Hannoverana. Hanover, 1819, 1 vol. 8vo.

*he*—Dispensatorium Electorale Hassiacum. Marburg, 1806, 1 vol. 8vo.

*li*—Dispensatorium Lippiacum genio moderno accommodatum. Lemgo, 1792, 94. 2 vols 8vo.

*lo*—Pharmacopœia Londinensis. London, 1815, 1 vol. 8vo.

*o*—Pharmacopœia Oldenburgica. Oldenburgh, 1801, 1 vol. 8vo.

*p*—Pharmacopœia Lusitana. Lisbon, 1711, 1 vol. folio.

*pa*—Dispensatorium Medico-Pharmaceuticum Palatinatus. Mannheim, 1764, 1 vol. folio.

*po*—Pharmacopœia regni Poloniæ. Warsaw, 1817, 1 vol. 8vo.

*pp*—Pharmacopœia Castrensis Borussica. Kœnigsburg, 1823, 1 vol. 8vo.

*pr*—Pharmacopœia Borussica. Berlin, 1813, 1 vol. 8vo.

*r*—Pharmacopœia Russica. St Petersburg, 1803, 1 vol. 8vo.

*s*—Pharmacopœia Saxonica. Dresden, 1820, 1 vol. 8vo.

*sa*—Pharmacopœia Sardoa. Turin, 1773, 4to.

*su*—Pharmacopœia Suecica. Stockholm, 1817, 1 vol. 4to.

*w*—Pharmacopœia Wirtembergica. Stutgard, 1798, 1 vol. folio.

*wu*—Pharmacopœia Herbipolitana. Wurzburg, 1796, 1 vol. 8vo.

*ww*—Pharmacopœia in usum Noiscomii Militaris Wurceburgensis. Wurzburg, 1815, 1 vol. 4to.

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*a*—Ainslie (Whitelaw), *Materia Medica*, or some account of those articles which are employed by the Hindoos and other eastern nations, in their medicine, arts and agriculture. London, 1826, 2 vols, 8vo.

*au*—Augustin (Frederick Louis), *Pharmacopœia extemporanea*, exhibens compositiones medicamentorum, ad observata et principia recentiorum accommodatas. Berlin, 1822, 1 vol. 18mo.

- b*—Brera (Valerien Louis), Ricettario Clinico. Padua, 1825, 1 vol. 8vo.
- be*—Bergius (Peter Jonas), Materia Medica e regno vegetabili sistens, simplicia officinalia, pariter atque culinaria. Stockholm, 1782, 2 vols 8vo.
- bo*—Bories, Formulaire de Montpellier. Montpellier, 1822, 1 vol. 12mo.
- br*—Burgnatelli (L. V.), Pharmacopée Générale à l'usage des pharmaciens et des médecins modernes, traduite de l'Italien par Planche. Paris, 1811, 2 vols 8vo.
- br\** designates the additions of Planche.
- c*—Coxe (John Redman), The American Dispensatory, containing the natural, chemical, pharmaceutical, and medical history of the different substances employed in medicine. Philadelphia, 1825, 1 vol. 8vo.
- ca*—Cadet de Gassicourt (C. L.), Formulaire Magistral, et Mémorial Pharmaceutique. Paris, 1823, 1 vol. 18mo, 5th edition, published by V. Bally.
- e*—Ellis (Benjamin), The Medical Formulary, being a collection of prescriptions derived from the writings and practice of many of the most eminent physicians in America and Europe. Philadelphia, 1826, 1 vol. 8vo.
- fp*—Dispensaire du Bureau de Charité de Paris. Paris, 1819, 8vo.
- g*—Guibourt, (N. J. B. G.) Histoire abrégée des Drogues Simples. Paris, 1826, 2 vols 8vo.
- hp*—Hufeland (C. G.), Armenpharmacopœia. Berlin, 1825, 8vo.
- m*—Murray (J. A.), et Gmelin (J. F.), Apparatus Medicaminum tam simplicium quam præparatorum et compositorum. Gottingen, 1776—96, 8 vols 8vo.
- ma*—Magendie (F.), Formulaire pour la préparation et l'emploi de plusieurs Nouveaux Médicaments. Paris, 1827, 12mo.
- pa*—Paris (J. A.), Pharmacologie. London, 1825. 2 vols 8vo.



- pid*—Piderit (P. J.), *Pharmacia Rationalis*. Gerlach, 1806, 1 vol. 8vo.
- pie*—Pierquin, *Memorial Pharmaceutique*. Montpellier, 1824, 32mo.
- ra*—Ratier (F. S.), *Formulaire pratique des Hôpitaux Civils de Paris*. Paris, 1827; 18mo.
- sa*—Saunders (William), *Pharmacopœia in usum Studiosorum*. Leipsic, 1790, 8vo.
- sm*—Saint-Marie (Etienne), *Nouveau Formulaire Médical et Pharmaceutique*. Paris and Lyons, 1820, 1 vol. 8vo.
- sp*—Spielmann (James), *Pharmacopœia Generalis*. Strasburg, 1783, 1 vol. 4to.
- sw*—Swediaur (F.), *Pharmacopœia Medici Practici Universalis*. Brussels; 1817, 3 vols 12mo; 3d edition, by J. B. Van Mons.
- sw\** indicates the additions of Van Mons.
- sy*—*Pharmacopœia Syphilitica*. Paris, 1799, 12mo, by F. Swediaur.
- vm*—Van Mons, (J. B.) *Pharmacopée usuelle, théorique et pratique*. Louvain, 1821, 2 vols 8vo.
- z*—Zarda (A. V.), *Pharmaca Vegetabilia juxta Pharmacopœiam Austriaco-provincialem*. Prague, 1782, 1 vol. 8vo.

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*New Organic Alkalies discovered in Cinchona Bark.*—We derive the following interesting article from the *Journal des Progres*, Vol. III. for 1829. Dr Serturner, chemist of Hameln; remarked, during the prevalence of an epidemic intermittent fever in 1828, that the quinia was far from being a certain specific against this disease, even when given in doses of six or eight grains; conjoined with acids. It stopped the paroxysm, but not in a permanent manner; for there were many relapses, which made it necessary to resort to the bark in substance, which, administered in large doses, in conjunction with acids, rendered the relapses much less frequent. Dr Serturner likewise ascertained, what has been

observed by other practitioners, that quinia cannot be substituted for cinchona, as a tonic. He was, therefore, induced to undertake new analytical researches on the different kinds of cinchona bark, with the view of ascertaining the cause of this difference. The details of his experiments he reserves for future publication, communicating at present his principal results, which are as follows :

The precipitates obtained by treating the acidulous extracts of cinchona bark by alkalies, comprise, besides quinia and cinchona, certain additional organic alkalies, which may be considered as modifications of the former.

These new organic alkalies, and especially the principal one, which Dr S. calls chinoidia (*chinoidine*), are intimately united with a sub-acid resinous substance, which, if not hurtful, is at least not beneficial, and which is very difficult to separate. Its separation can be effected completely, only by the vegeto-animal charcoal, which is obtained in the preparation of safranic acid, discovered by M. Liebig. After having dissolved in strong sulphuric acid, (diluted with three or four times its weight of water) the impure alkaline substance, which remains after the sulphate of quinia has been separated by crystallization, the solution is to be decolorized, by means of a mixture of the vegeto-animal charcoal, above-mentioned, with ordinary animal charcoal. But, before conducting this decoloration, it is best to treat the solution with alcohol, in order to separate the earthy salts.

The new alkali exists in the cinchona barks, associated with quinia and cinchona.

*Properties of chinoidia.* It resembles the other alkalies of the cinchona bark, in its insolubility in water, its colour and taste. But it is distinguished from them by its activity, and its greater capacity of saturation. Its alkaline reaction, and its intimate combination with an extractive matter, which is probably an acid, are characters not less striking. Its salts, when freed from extractive, are affected by heat and liquids, after the manner of balsams; being vis-



acid and fusible like the latter, although they contain frequently, to all appearance, their acids in a dry state. As a medicine, chinicidia is one of the most precious agents of the materia medica. It is not merely a better febrifuge than quinia, and even than the bark in substance; but it possesses many other therapeutic properties, which, admitting that they exist in the bark itself, are not to be found in quinia. It was prescribed by Dr Serturmer [in saline combination?] in the dose of two grains, three times a day, with the direction to swallow a little vinegar after each dose, with the view of saturating the gastric juice, which is sometimes alkaline in fevers, and which by acting on the salt, sets free the chinicidia, and thereby renders the medicine inert, in consequence of the insolubility of the new alkali when uncombined. In all the cases, treated by the new remedy, the fever was cut short without relapse, and in every instance, the concomitant symptoms, such as the paleness of face, loss of appetite, œdema of the legs, &c. disappeared in a shorter time than is usually the case. The medicine failed only in a single instance. The quantity necessary to effect a cure was generally from twelve to twenty-four grains.—*N. Am. Med. and Surg. Journal.*

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*Artificial Preparation of Ice.*—After numerous trials made by M. B. Meylink with different salts, for the purpose of converting water contained in a tin vessel into ice during their solution, he ultimately gave the preference to a mixture of four ounces nitrate of ammonia, four ounces subcarbonate of soda, and four ounces of water. This mixture in three hours produced ten ounces of ice; whilst with the mixture of sulphate of soda and muriatic acid, he obtained ice only after seven hours.

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*Action of Iron on Ammonia.*—M. Despretz announced some time since, that when heated metals were subjected to the action of ammoniacal gas, they underwent a considerable

change in their weight, in consequence of combining with some part of the ammonia.

He now states that the weight of iron is sometimes increased as much as 11.5 per cent. in such an experiment, in consequence of the combination of nitrogen with it. If the temperature applied be too high, the nitrogen is expelled, and the compound destroyed.—*La Globe*, April 14.

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*Adulteration of Chromate of Potash; its detection.*—The chromate of potash has the power of combining with other salts of potash up to a certain extent, without any very sensible change in its form and appearance; and hence it has been sent into the market for the dyers, falsified by considerable quantities of sulphate and muriate of potash, the presence of which it has been difficult to ascertain.

M. Zuler has, in consequence, and in consideration of the power of vegetable acids upon it, devised the following process for this purpose:—Add a large excess of tartaric acid to the chromate of potash to be tried; the chromate will be decomposed, and acquire in about ten minutes a deep amethyst colour. It will now, if pure, form no precipitate with nitrate of baryta or silver, by which means the presence of muriate or sulphate of potash may be readily ascertained.—*Bull. de Mulhause*.

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*Preparation of Hartshorn Jelly.*—The following process is due to M. Ferrez: Four ounces of rasped hartshorn are to be steeped in eight ounces of water, acidulated with sixty grains of muriatic acid for ten minutes, and then washed carefully in two or three waters. It is then to be boiled with fresh water for half an hour, pressed through a cloth, and the liquid filtered whilst hot. This fluid is the jelly, which, being qualified by sugar or other ingredients and boiled slightly, gives upon cooling, a perfectly clear and good jelly for the table.—*Jour. de Pharmacie*, 1828.



*Gathering of Medicinal Roots.*—According to M. Kittel, roots should always be gathered in the autumn. This rule is without exception for all plants not annuals, with this difference, that the roots of biannuals should be gathered in the first year, whilst those of the rest may be gathered any year in their lifetime; but the roots gathered before the flowering year are always more charged with active principles than those which have often supported a stem and flowers, so that roots of the first, second, and third year, are better than older roots. This is especially the case with aromatic and narcotic roots, as arnica, briony, gentian, belladonna, angelica, liquorice, sarsaparilla, dandelion, fennel, &c. The volatile, bitter, aromatic, nauseous, and in general, all active, peculiar principles, are more abundant in the cortical layers of the roots, than in the woody part.

For these reasons M. Kittel says, that fresh roots should never be allowed to be bought and sold for medicinal use, except in the autumn and winter.—*Repertorium der Pharmacie.*

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*Decomposition of Corrosive Sublimate by Vegetable Bodies.*—According to the experiments of M. Fabian, the mucilage of quince seed, (semence de coing), and that of salop, decomposes corrosive sublimate the instant it is mixed with its solution; but the decoction of marshmallow does not produce the same effect, and the extract of liquorice only partially.

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